

Appendix A¹

Documentation of Prediction Models Used for Risk Adjustment of Home Health Agency Outcome Reports

July 2003

by

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¹ This document is Appendix A to Peter W. Shaughnessy and David F. Hittle, "Overview of Risk Adjustment and Outcome Measures for Home Health Agency OBQI Reports: Highlights of Current Approaches and Outline of Planned Enhancements," September 2002, available at <http://cms.hhs.gov/providers/hha/RiskAdj1.pdf>.

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Documentation of Prediction Models Used for Risk Adjustment of Home Health Agency Outcome Reports

The purpose of this document is to provide descriptions of the prediction models used to risk adjust outcome rates presented in home health agency outcome-based quality improvement (OBQI) reports. The risk models documented here have been used for outcome reports from April 2003 onward. They were developed using OASIS national repository data from calendar year 2001. A logistic regression model for each of 30 outcome measures was developed using a national sample of up to 500,000 home health agency patient episodes,² and validated using a larger set-aside sample of one million patient episodes from the same source.

It is important to note that as (a) additional OASIS data are received from year-to-year; (b) OASIS data accuracy improves with increased experience on the part of providers of home care; and (c) changes to data items are implemented as a result of the OASIS and OBQI Change and Evolution Program (OCEP), including the activities of the OCEP Technical Expert Panel, the models will be improved and updated on a regular basis. The next routine update of risk models is likely to be implemented in the spring or summer of 2004.

Use of Risk Models in Risk-Adjusted Outcome Reports

The risk-adjusted outcome report provided for home health agency outcome-based quality improvement includes, for each outcome measure, the agency's observed (actual) outcome rate and a risk-adjusted national reference rate. The observed agency outcome rate is simply the number of patients who achieve a particular outcome (e.g., improvement in ambulation) divided by the number of patients eligible for that outcome, over a fixed period of time (12 months). The national reference rate³ is calculated based on the observed national outcome rate (for the same time period as the agency observed outcome rate), adjusted to reflect case mix differences between the agency's patients and home health patients nationally. The method used to calculate the national reference rate for a given outcome for each home health agency is as follows:

- A predicted outcome probability is calculated for each patient in the agency, based on the patient's health status and other attributes at admission to home health care, using a statistical model specific to that outcome, as described later in this document.
- Predicted outcome probabilities are averaged across all of the agency's patients eligible for that particular outcome to yield an agency-specific predicted outcome rate.
- Predicted outcome probabilities are averaged across all home health patients in the nation eligible for that particular outcome to yield a national predicted outcome rate.

² The number of cases used for risk model development varies from one outcome measure to another, depending on the specific exclusion criteria that apply to each measure.

³ The method used currently to calculate an agency-specific national reference rate for OBQI reports differs from the method used during the national OBQI demonstration, which is described in the body of the paper for which this document is an appendix. For the demonstration, models were estimated using a reference sample of patient episodes from the same time period as that covered by agency reports, and the agency's predicted outcome rate was reported as the agency-specific reference rate. The current method takes into account any differences in case mix or outcome performance that may exist between the sample used to estimate risk model parameters and the current national population of home health patients. This was not necessary during the demonstration because the reference population and the sample used for risk model estimation were essentially one and the same.

- The National (Risk-Adjusted) Reference Rate for a specific agency is calculated as:

National Observed Rate + (Agency-Specific Predicted Rate - National Predicted Rate)

This method of calculating a risk-adjusted reference rate for home health agencies takes into account variations between agencies in patient case mix, and it provides a means for all agencies to measure their outcomes against a risk-adjusted standard that reflects current national outcome performance.

Reading the Prediction Model Tables

Each table contains the following information:

- **Table Title**--The title identifies the name of the outcome measure model being presented. In some cases, e.g., Improvement in Transferring, the prediction model is comprised of several submodels, each estimated on a distinct subpopulation of patients. In each of these cases a brief narrative is included explaining the defining criteria for these subpopulations and how the submodels are used to calculate predicted outcome values for all patients. Subtitles are used to distinguish among the separate submodels.
- **Risk Factor Measured at SOC/ROC** -- This column lists the risk factors included in the prediction model. All risk factors pertain to Start of Care (SOC) or Resumption of Care after inpatient stay (ROC) unless indicated otherwise. The number of values in the measurement scale for each risk factor is displayed in parentheses. For risk factors that take on the value 0 and 1, the value 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors that pertain to health or functional status and are defined using a scale that takes on more than two values, higher values of the scale typically indicate greater impairment or severity of illness. The meaning associated with specific numeric values for most risk factors can be determined by examining the related OASIS data item(s).
- **Coefficient**--The coefficient listed next to the risk factor is the coefficient for the risk factor in the logistic regression model for the outcome measure. All coefficients and associated odds ratios are significant at $p < .10$ using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients are considered significant at $p < .10$ because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction purposes, typically resulting in more stable models whose performance is superior under cross-validation.
- **Odds Ratio**--For a 0-1 risk factor, the odds ratio is the likelihood of the outcome when the risk factor is present divided by the likelihood of the outcome when the risk factor is not present. In general, the odds ratio indicates the strength of relationship between a risk factor and the outcome measure. The larger or smaller an odds ratio is for a particular risk factor (i.e., >1.00 or <1.00), the more influence the risk factor has on the outcome measure, in a positive or negative direction.
- **90% CI**--These are the 90% confidence limits of the odds ratios in the previous column.
- **Number of Risk Factors**--This is the number of unique risk factors that are used in the logistic regression model for predicting the outcome measure. For models that are comprised of

several submodels, e.g., Improvement in Transferring, both the number of unique risk factors in each submodel and the number of unique risk factors when all the submodels are combined are given.

- R²--The R² value is the squared correlation between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R² and the C-statistic.
- C--The C-statistic is the area under the Receiver Operating Characteristic curve. Intuitively, it is defined as follows. Let Y=1 denote outcome attainment, Y=0 denote nonattainment, and \hat{p} denote the predicted probability that Y=1. Enumerate all possible pairs of sample patients for whom Y=1 for the first patient and Y=0 for the second patient. C is the proportion of such pairs where \hat{p} for the patient with Y=1 is larger than \hat{p} for the patient with Y=0.

TABLE 1: Logistic Regression Model for Predicting the Outcome of Improvement in Grooming.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.278	1.320	(1.237 - 1.408)
Inpatient discharge from hospital (0-1)	0.399	1.491	(1.445 - 1.538)
Inpatient discharge from rehab. facility (0-1)	0.514	1.672	(1.598 - 1.750)
Inpatient discharge from nursing home (0-1)	0.488	1.629	(1.548 - 1.714)
Moderate or better recovery prognosis (0-1)	0.199	1.220	(1.155 - 1.288)
Good functional status rehabilitation prognosis (0-1)	0.290	1.337	(1.289 - 1.386)
Patient lives with family member (0-1)	0.114	1.121	(1.068 - 1.177)
Patient lives alone (0-1)	0.214	1.239	(1.173 - 1.309)
Patient has unpaid live-in help (0-1)	0.159	1.173	(1.117 - 1.231)
Vision impairment (0-2)	-0.116	0.891	(0.869 - 0.913)
Speech/language impairment (0-5)	-0.115	0.891	(0.873 - 0.909)
Stage of most problematic pressure ulcer (0-4)	-0.130	0.878	(0.852 - 0.904)
Status of most problematic stasis ulcer (0-3)	-0.106	0.900	(0.864 - 0.937)
Surgical wound(s) present (0-1)	0.246	1.278	(1.210 - 1.350)
Number of surgical wounds present (0-4)	0.078	1.082	(1.051 - 1.113)
Dyspnea (0-4)	-0.014 ^b	0.986	(0.974 - 0.998)
Urinary incontinence severity 1 (0-4)	-0.061	0.941	(0.931 - 0.952)
Bowel incontinence frequency (0-5)	-0.044	0.957	(0.943 - 0.971)
Demonstrated behavior: verbal disruption (0-1)	-0.251	0.778	(0.707 - 0.857)
Disability in cognitive functioning (0-4)	-0.040	0.961	(0.938 - 0.985)
Confusion scale (0-4)	-0.049	0.952	(0.936 - 0.969)
Disability in grooming (0-3)	1.112	3.041	(2.938 - 3.148)
Disability in dressing upper body (0-3)	-0.199	0.819	(0.798 - 0.841)
Disability in toileting (0-4)	-0.105	0.901	(0.885 - 0.917)
Disability in transferring (0-5)	-0.110	0.896	(0.876 - 0.916)
Disability in ambulation (0-5)	-0.108	0.897	(0.880 - 0.915)
Disability in eating (0-5)	-0.108	0.898	(0.879 - 0.917)
Disability in light meal preparation (0-2)	-0.054	0.947	(0.921 - 0.974)
Disability in mgt. of oral medications (0-2)	-0.205	0.815	(0.796 - 0.835)
Disability in housekeeping (0-4)	-0.038	0.963	(0.944 - 0.982)
Disability in telephone use (0-5)	-0.104	0.901	(0.891 - 0.911)
ADL assistance provided by caregiver (0-1)	-0.097	0.907	(0.879 - 0.937)
Prior (2 weeks ago) disability in grooming (0-3)	-0.162	0.851	(0.825 - 0.877)
Prior (2 weeks ago) disability in dressing lower body (0-3)	-0.054	0.947	(0.922 - 0.973)
Prior (2 weeks ago) disability in bathing (0-5)	-0.037	0.964	(0.949 - 0.979)
Prior (2 weeks ago) disability in laundry (0-2)	-0.153	0.858	(0.832 - 0.886)
Prior (2 weeks ago) disability in shopping (0-3)	-0.044	0.957	(0.936 - 0.979)
Acute condition: terminal (0-1)	-0.308	0.735	(0.680 - 0.795)
Acute condition: oxygen therapy (0-1)	-0.130	0.878	(0.841 - 0.917)
Acute condition: IV/Infusion therapy (0-1)	-0.205	0.815	(0.742 - 0.895)
Total number of chronic conditions reported (0-9)	-0.022 ^a	0.978	(0.964 - 0.992)
Diagnosis: neoplasms (0-1)	-0.223	0.800	(0.762 - 0.839)
Diagnosis: endocrine/nutritional/metabolic (0-1)	-0.069	0.933	(0.906 - 0.961)
Diagnosis: blood diseases (0-1)	-0.085	0.919	(0.874 - 0.966)
Diagnosis: nervous system disorder (0-1)	-0.230	0.794	(0.765 - 0.825)
Diagnosis: genitourinary system diseases (0-1)	-0.102	0.903	(0.868 - 0.940)
Diagnosis: skin/subcutaneous diseases (0-1)	-0.176	0.839	(0.790 - 0.891)
Diagnosis: other injury (0-1)	-0.179	0.837	(0.792 - 0.884)
Length of stay: more than 31 days (0-1)	0.276	1.317	(1.282 - 1.353)
Constant	-0.170 ^a		

Number of Risk Factors: 49

TABLE 1: Logistic Regression Model for Predicting the Outcome of Improvement in Grooming. (Cont'd)

Developmental Sample $R^2 = 0.238^{\S}$	Validation Sample $R^2 = 0.243^{\S}$
Developmental Sample C-statistic = 0.784^{\S}	Validation Sample C-statistic = 0.787^{\S}

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

† The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.

‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.

§ The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]

TABLE 2: Logistic Regression Model for Predicting the Outcome of Stabilization in Grooming.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Inpatient discharge from hospital (0-1)	0.110	1.117	(1.055 - 1.181)
Inpatient discharge from rehab. facility (0-1)	0.195	1.215	(1.116 - 1.323)
Inpatient discharge from nursing home (0-1)	0.217	1.243	(1.132 - 1.364)
Moderate or better recovery prognosis (0-1)	0.200	1.221	(1.104 - 1.351)
Good functional status rehabilitation prognosis (0-1)	0.272	1.313	(1.228 - 1.403)
Drug dependency at SOC (0-1)	-0.239 ^b	0.787	(0.641 - 0.967)
Age (in years)	-0.008	0.992	(0.990 - 0.994)
Patient lives alone (0-1)	0.257	1.293	(1.209 - 1.382)
Patient has unpaid live-in help (0-1)	0.157	1.170	(1.087 - 1.260)
Vision impairment (0-2)	-0.071 ^a	0.931	(0.888 - 0.977)
Speech/language impairment (0-5)	-0.112	0.894	(0.860 - 0.929)
Stage 1-4 pressure ulcer(s) present (0-1)	-0.341	0.711	(0.647 - 0.783)
Stasis ulcer(s) present (0-1)	-0.323	0.724	(0.626 - 0.837)
Surgical wound(s) present (0-1)	0.261	1.298	(1.167 - 1.443)
Number of surgical wounds present (0-4)	0.112	1.119	(1.057 - 1.184)
Urinary incontinence severity 1 (0-4)	-0.043	0.958	(0.940 - 0.977)
Bowel incontinence frequency (0-5)	-0.045 ^a	0.956	(0.927 - 0.986)
Demonstrated behavior: verbal disruption (0-1)	-0.367	0.693	(0.574 - 0.835)
Confusion scale (0-4)	-0.103	0.902	(0.877 - 0.927)
Disability in grooming (0-3)	1.382	3.984	(3.802 - 4.174)
Disability in dressing upper body (0-3)	-0.308	0.735	(0.702 - 0.770)
Disability in dressing lower body (0-3)	-0.103	0.902	(0.866 - 0.941)
Disability in toileting (0-4)	-0.170	0.844	(0.813 - 0.876)
Disability in transferring (0-5)	-0.088	0.916	(0.875 - 0.959)
Disability in ambulation (0-5)	-0.149	0.862	(0.829 - 0.896)
Disability in eating (0-5)	-0.108	0.898	(0.861 - 0.937)
Disability in light meal preparation (0-2)	-0.124	0.884	(0.845 - 0.925)
Disability in mgt. of oral medications (0-2)	-0.265	0.767	(0.735 - 0.800)
Disability in transportation (0-2)	-0.182 ^a	0.833	(0.737 - 0.943)
Disability in housekeeping (0-4)	-0.097	0.908	(0.879 - 0.938)
Disability in telephone use (0-5)	-0.092	0.912	(0.892 - 0.933)
ADL assistance provided by caregiver (0-1)	-0.246	0.782	(0.737 - 0.829)
Prior (2 weeks ago) disability in bathing (0-5)	-0.079	0.925	(0.904 - 0.945)
Prior (2 weeks ago) disability in housekeeping (0-4)	-0.047	0.954	(0.926 - 0.982)
Prior (2 weeks ago) disability in shopping (0-3)	-0.101	0.904	(0.871 - 0.940)
Acute condition: terminal (0-1)	-0.476	0.622	(0.544 - 0.710)
Acute condition: mental/emotional (0-1)	-0.207 ^b	0.813	(0.677 - 0.975)
Acute condition: oxygen therapy (0-1)	-0.272	0.762	(0.709 - 0.819)
Acute condition: IV/Infusion therapy (0-1)	-0.336	0.715	(0.607 - 0.841)
Acute condition: ventilator (0-1)	-0.893 ^a	0.410	(0.207 - 0.811)
Diagnosis: neoplasms (0-1)	-0.513	0.599	(0.554 - 0.648)
Diagnosis: nervous system disorder (0-1)	-0.160	0.852	(0.792 - 0.916)
Length of stay: more than 62 days (0-1)	-0.503	0.605	(0.559 - 0.654)
Constant	4.305		

Number of Risk Factors: 43

Developmental Sample $R^2 = 0.113^{\S}$

Validation Sample $R^2 = 0.109^{\S}$

Developmental Sample C-statistic = 0.804^{\S}

Validation Sample C-statistic = 0.801^{\S}

**TABLE 2: Logistic Regression Model for Predicting the Outcome of Stabilization in Grooming.
(Cont'd)**

- * SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.
- † The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.
- ‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.
- § The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]
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TABLE 3: Logistic Regression Model for Predicting the Outcome of Improvement in Dressing Upper Body.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.286	1.331	(1.246 - 1.422)
Inpatient discharge from hospital (0-1)	0.427	1.533	(1.489 - 1.579)
Inpatient discharge from rehab. facility (0-1)	0.491	1.633	(1.567 - 1.702)
Inpatient discharge from nursing home (0-1)	0.484	1.622	(1.548 - 1.699)
Moderate or better recovery prognosis (0-1)	0.203	1.225	(1.163 - 1.291)
Good functional status rehabilitation prognosis (0-1)	0.286	1.332	(1.287 - 1.378)
Obesity at SOC (0-1)	-0.046 ^a	0.955	(0.920 - 0.992)
Age (in years)	-0.002	0.998	(0.997 - 0.999)
Gender: female (0-1)	-0.041 ^a	0.960	(0.935 - 0.986)
Patient lives alone (0-1)	0.233	1.263	(1.219 - 1.308)
Patient has unpaid live-in help (0-1)	0.238	1.269	(1.221 - 1.318)
Vision impairment (0-2)	-0.062	0.940	(0.919 - 0.962)
Speech/language impairment (0-5)	-0.096	0.908	(0.892 - 0.925)
Stage of most problematic pressure ulcer (0-4)	-0.110	0.896	(0.870 - 0.922)
Status of most problematic stasis ulcer (0-3)	-0.124	0.883	(0.849 - 0.919)
Surgical wound(s) present (0-1)	0.309	1.362	(1.285 - 1.443)
Number of surgical wounds present (0-4)	0.075	1.078	(1.051 - 1.105)
Urinary incontinence severity 1 (0-4)	-0.059	0.943	(0.933 - 0.953)
Bowel incontinence frequency (0-5)	-0.028	0.972	(0.958 - 0.986)
Demonstrated behavior: verbal disruption (0-1)	-0.226	0.798	(0.725 - 0.877)
Confusion scale (0-4)	-0.045	0.956	(0.943 - 0.969)
Disability in grooming (0-3)	-0.119	0.888	(0.871 - 0.905)
Disability in dressing upper body (0-3)	1.014	2.756	(2.679 - 2.834)
Disability in toileting (0-4)	-0.116	0.891	(0.876 - 0.906)
Disability in transferring (0-5)	-0.128	0.880	(0.861 - 0.899)
Disability in ambulation (0-5)	-0.160	0.852	(0.836 - 0.868)
Disability in eating (0-5)	-0.087	0.917	(0.899 - 0.935)
Disability in light meal preparation (0-2)	-0.117	0.890	(0.868 - 0.912)
Disability in mgt. of oral medications (0-2)	-0.233	0.792	(0.775 - 0.810)
Disability in housekeeping (0-4)	-0.040	0.961	(0.943 - 0.980)
Disability in telephone use (0-5)	-0.081	0.922	(0.912 - 0.932)
ADL assistance provided by caregiver (0-1)	-0.161	0.851	(0.827 - 0.876)
Prior (2 weeks ago) disability in dressing lower body (0-3)	-0.160	0.852	(0.834 - 0.871)
Prior (2 weeks ago) disability in bathing (0-5)	-0.047	0.954	(0.940 - 0.968)
Prior (2 weeks ago) disability in laundry (0-2)	-0.137	0.872	(0.841 - 0.903)
Prior (2 weeks ago) disability in housekeeping (0-4)	-0.029 ^a	0.972	(0.953 - 0.991)
Acute condition: open wound/lesion (0-1)	-0.047 ^b	0.954	(0.916 - 0.993)
Acute condition: terminal (0-1)	-0.282	0.754	(0.700 - 0.812)
Acute condition: oxygen therapy (0-1)	-0.136	0.873	(0.841 - 0.906)
Acute condition: IV/Infusion therapy (0-1)	-0.202	0.817	(0.749 - 0.891)
Acute condition: ventilator (0-1)	-0.464 ^b	0.629	(0.421 - 0.940)
Total number of chronic conditions reported (0-9)	-0.034	0.966	(0.954 - 0.979)
Diagnosis: neoplasms (0-1)	-0.254	0.775	(0.742 - 0.810)
Diagnosis: endocrine/nutritional/metabolic (0-1)	-0.044	0.957	(0.931 - 0.984)
Diagnosis: nervous system disorder (0-1)	-0.246	0.782	(0.754 - 0.811)
Diagnosis: genitourinary system diseases (0-1)	-0.085	0.919	(0.885 - 0.954)
Diagnosis: skin/subcutaneous diseases (0-1)	-0.136	0.873	(0.824 - 0.925)
Diagnosis: other injury (0-1)	-0.138	0.871	(0.826 - 0.919)
Length of stay: more than 31 days (0-1)	0.316	1.371	(1.337 - 1.406)
Constant	-0.030 ^b		

TABLE 3: Logistic Regression Model for Predicting the Outcome of Improvement in Dressing Upper Body. (Cont'd)

Number of Risk Factors: 49

Developmental Sample $R^2 = 0.233^{\S}$

Validation Sample $R^2 = 0.236^{\S}$

Developmental Sample C-statistic = 0.780^{\S}

Validation Sample C-statistic = 0.783^{\S}

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

† The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.

‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.

§ The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]

TABLE 4: Logistic Regression Model for Predicting the Outcome of Improvement in Dressing Lower Body.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.282	1.325	(1.217 - 1.443)
Inpatient discharge from hospital (0-1)	0.398	1.488	(1.432 - 1.547)
Inpatient discharge from rehab. facility (0-1)	0.420	1.522	(1.444 - 1.603)
Inpatient discharge from nursing home (0-1)	0.414	1.512	(1.425 - 1.605)
Medical regimen change in past 14 days (0-1)	0.123	1.131	(1.083 - 1.181)
Moderate or better recovery prognosis (0-1)	0.251	1.286	(1.196 - 1.382)
Good functional status rehabilitation prognosis (0-1)	0.238	1.269	(1.212 - 1.329)
Obesity at SOC (0-1)	-0.205	0.814	(0.777 - 0.854)
Age (in years)	-0.003	0.997	(0.995 - 0.999)
Patient lives alone (0-1)	0.326	1.385	(1.326 - 1.448)
Patient has unpaid live-in help (0-1)	0.173	1.189	(1.129 - 1.251)
Speech/language impairment (0-5)	-0.078	0.925	(0.902 - 0.948)
Stage of most problematic pressure ulcer (0-4)	-0.135	0.874	(0.845 - 0.904)
Status of most problematic stasis ulcer (0-3)	-0.192	0.825	(0.785 - 0.867)
Surgical wound(s) present (0-1)	0.139	1.149	(1.069 - 1.235)
Number of surgical wounds present (0-4)	0.089	1.093	(1.061 - 1.125)
Urinary incontinence severity 1 (0-4)	-0.074	0.929	(0.916 - 0.941)
Bowel incontinence frequency (0-5)	-0.030 ^a	0.971	(0.952 - 0.990)
Demonstrated behavior: verbal disruption (0-1)	-0.250	0.779	(0.681 - 0.891)
Confusion scale (0-4)	-0.034	0.967	(0.949 - 0.985)
Disability in dressing lower body (0-3)	0.774	2.168	(2.097 - 2.241)
Disability in bathing (0-5)	-0.053	0.949	(0.930 - 0.967)
Disability in toileting (0-4)	-0.090	0.914	(0.893 - 0.935)
Disability in transferring (0-5)	-0.144	0.866	(0.841 - 0.892)
Disability in ambulation (0-5)	-0.186	0.831	(0.810 - 0.852)
Disability in eating (0-5)	-0.043	0.958	(0.933 - 0.984)
Disability in light meal preparation (0-2)	-0.082	0.921	(0.894 - 0.949)
Disability in mgt. of oral medications (0-2)	-0.151	0.860	(0.833 - 0.888)
Disability in housekeeping (0-4)	-0.048	0.953	(0.932 - 0.975)
Disability in telephone use (0-5)	-0.062	0.940	(0.926 - 0.953)
ADL assistance provided by caregiver (0-1)	-0.225	0.799	(0.770 - 0.828)
Prior (2 weeks ago) disability in dressing upper body (0-3)	-0.159	0.853	(0.830 - 0.876)
Prior (2 weeks ago) disability in laundry (0-2)	-0.091	0.913	(0.874 - 0.953)
Prior (2 weeks ago) disability in housekeeping (0-4)	-0.053	0.948	(0.926 - 0.971)
Acute condition: open wound/lesion (0-1)	-0.137	0.872	(0.828 - 0.918)
Acute condition: terminal (0-1)	-0.185	0.831	(0.752 - 0.919)
Acute condition: oxygen therapy (0-1)	-0.107	0.898	(0.855 - 0.943)
Acute condition: IV/Infusion therapy (0-1)	-0.184	0.832	(0.744 - 0.930)
Chronic condition: dependence in personal care (0-1)	-0.118	0.889	(0.847 - 0.934)
Chronic condition: dependence in medication admin. (0-1)	-0.112	0.894	(0.853 - 0.938)
Diagnosis: neoplasms (0-1)	-0.118	0.889	(0.841 - 0.940)
Diagnosis: endocrine/nutritional/metabolic (0-1)	-0.047 ^a	0.954	(0.921 - 0.989)
Diagnosis: blood diseases (0-1)	-0.071 ^a	0.931	(0.878 - 0.989)
Diagnosis: nervous system disorder (0-1)	-0.209	0.812	(0.773 - 0.851)
Diagnosis: genitourinary system diseases (0-1)	-0.080	0.923	(0.879 - 0.969)
Length of stay: more than 31 days (0-1)	0.320	1.377	(1.333 - 1.423)
Constant	-0.172 ^b		

TABLE 4: Logistic Regression Model for Predicting the Outcome of Improvement in Dressing Lower Body. (Cont'd)

Number of Risk Factors:	46	
Developmental Sample $R^2 = 0.210^{\S}$		Validation Sample $R^2 = 0.208^{\S}$
Developmental Sample C-statistic = 0.763^{\S}		Validation Sample C-statistic = 0.762^{\S}

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

† The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.

‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.

§ The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]

TABLE 5: Logistic Regression Model for Predicting the Outcome of Improvement in Bathing.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.267	1.306	(1.215 - 1.404)
Inpatient discharge from hospital (0-1)	0.340	1.405	(1.361 - 1.451)
Inpatient discharge from rehab. facility (0-1)	0.355	1.426	(1.364 - 1.490)
Inpatient discharge from nursing home (0-1)	0.327	1.387	(1.320 - 1.458)
Moderate or better recovery prognosis (0-1)	0.205	1.227	(1.151 - 1.308)
Good functional status rehabilitation prognosis (0-1)	0.288	1.333	(1.281 - 1.388)
Obesity at SOC (0-1)	-0.098	0.907	(0.871 - 0.945)
Age (in years)	-0.007	0.994	(0.992 - 0.995)
Gender: female (0-1)	-0.116	0.891	(0.864 - 0.918)
Patient lives in own home (0-1)	0.072	1.074	(1.038 - 1.112)
Patient lives with family member (0-1)	0.135	1.144	(1.090 - 1.201)
Patient lives alone (0-1)	0.185	1.203	(1.138 - 1.272)
Vision impairment (0-2)	-0.031 ^b	0.970	(0.943 - 0.997)
Speech/language impairment (0-5)	-0.062	0.940	(0.918 - 0.963)
Stage 1-4 pressure ulcer(s) present (0-1)	-0.282	0.754	(0.703 - 0.809)
Stasis ulcer(s) present (0-1)	-0.432	0.649	(0.589 - 0.715)
Surgical wound(s) present (0-1)	0.166	1.181	(1.122 - 1.242)
Number of surgical wounds present (0-4)	0.085	1.088	(1.061 - 1.116)
Urinary incontinence severity 1 (0-4)	-0.044	0.957	(0.943 - 0.971)
Bowel incontinence frequency (0-5)	-0.045	0.956	(0.939 - 0.973)
Demonstrated behavior: verbal disruption (0-1)	-0.222	0.801	(0.707 - 0.908)
Disability in cognitive functioning (0-4)	-0.035 ^a	0.966	(0.939 - 0.993)
Confusion scale (0-4)	-0.022 ^b	0.978	(0.959 - 0.998)
Disability in dressing upper body (0-3)	-0.050	0.952	(0.933 - 0.971)
Disability in bathing (0-5)	0.771	2.163	(2.124 - 2.202)
Disability in toileting (0-4)	-0.079	0.924	(0.905 - 0.944)
Disability in transferring (0-5)	-0.097	0.908	(0.885 - 0.930)
Disability in ambulation (0-5)	-0.222	0.801	(0.783 - 0.819)
Disability in mgt. of oral medications (0-2)	-0.106	0.899	(0.874 - 0.925)
Disability in transportation (0-2)	-0.085 ^b	0.919	(0.854 - 0.989)
Disability in housekeeping (0-4)	-0.026	0.975	(0.962 - 0.988)
Disability in telephone use (0-5)	-0.037	0.964	(0.951 - 0.977)
ADL assistance provided by caregiver (0-1)	-0.089	0.915	(0.887 - 0.944)
Prior (2 weeks ago) disability in bathing (0-5)	-0.149	0.861	(0.849 - 0.874)
Prior (2 weeks ago) disability in transportation (0-2)	-0.087	0.916	(0.880 - 0.954)
Prior (2 weeks ago) disability in laundry (0-2)	-0.098	0.906	(0.881 - 0.933)
Prior (2 weeks ago) disability in shopping (0-3)	-0.040	0.961	(0.940 - 0.982)
Acute condition: terminal (0-1)	-0.257	0.773	(0.707 - 0.845)
Acute condition: oxygen therapy (0-1)	-0.126	0.882	(0.846 - 0.919)
Acute condition: enteral/parenteral nutrition (0-1)	-0.304	0.738	(0.660 - 0.826)
Chronic condition: urinary incontinence/catheter (0-1)	-0.095	0.910	(0.869 - 0.953)
Chronic condition: dependence in medication admin. (0-1)	-0.068	0.935	(0.898 - 0.973)
Diagnosis: neoplasms (0-1)	-0.102	0.904	(0.862 - 0.947)
Diagnosis: endocrine/nutritional/metabolic (0-1)	-0.034 ^b	0.967	(0.938 - 0.997)
Diagnosis: mental disease (0-1)	-0.051 ^b	0.951	(0.907 - 0.996)
Diagnosis: nervous system disorder (0-1)	-0.150	0.861	(0.825 - 0.898)
Diagnosis: genitourinary system diseases (0-1)	-0.068	0.934	(0.896 - 0.974)
Diagnosis: skin/subcutaneous diseases (0-1)	-0.169	0.845	(0.794 - 0.898)
Diagnosis: other injury (0-1)	-0.136	0.873	(0.825 - 0.924)
Length of stay: more than 31 days (0-1)	0.267	1.306	(1.270 - 1.342)
Constant	-0.908		

TABLE 5: Logistic Regression Model for Predicting the Outcome of Improvement in Bathing. (Cont'd)

Number of Risk Factors: 50

Developmental Sample $R^2 = 0.192^{\S}$

Validation Sample $R^2 = 0.193^{\S}$

Developmental Sample C-statistic = 0.755^{\S}

Validation Sample C-statistic = 0.755^{\S}

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

† The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.

‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.

§ The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]

TABLE 6: Logistic Regression Model for Predicting the Outcome of Stabilization in Bathing.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medical regimen change in past 14 days (0-1)	0.129	1.137	(1.078 - 1.200)
Moderate or better recovery prognosis (0-1)	0.313	1.367	(1.249 - 1.497)
Good functional status rehabilitation prognosis (0-1)	0.216	1.241	(1.168 - 1.317)
Obesity at SOC (0-1)	-0.099 ^a	0.906	(0.850 - 0.965)
Age (in years)	-0.015	0.985	(0.983 - 0.987)
Gender: female (0-1)	-0.123	0.885	(0.846 - 0.925)
Infrequency of caregiver assistance (1-7)	-0.044	0.957	(0.947 - 0.967)
Status of most problematic pressure ulcer (0-3)	-0.145	0.865	(0.826 - 0.906)
Number of stasis ulcers present (0-4)	-0.118	0.888	(0.839 - 0.941)
Number of surgical wounds present (0-4)	0.153	1.165	(1.132 - 1.199)
Urinary catheter (0-1)	-0.203	0.816	(0.733 - 0.909)
Bowel ostomy (0-1)	-0.221 ^a	0.802	(0.693 - 0.927)
Bowel incontinence frequency (0-5)	-0.059	0.943	(0.917 - 0.969)
Confusion scale (0-4)	-0.049	0.952	(0.929 - 0.976)
Disability in dressing upper body (0-3)	-0.252	0.778	(0.749 - 0.807)
Disability in bathing (0-5)	1.100	3.005	(2.926 - 3.086)
Disability in toileting (0-4)	-0.157	0.855	(0.826 - 0.885)
Disability in transferring (0-5)	-0.192	0.825	(0.792 - 0.860)
Disability in ambulation (0-5)	-0.252	0.777	(0.751 - 0.804)
Disability in mgt. of oral medications (0-2)	-0.194	0.824	(0.794 - 0.855)
Disability in transportation (0-2)	-0.236	0.790	(0.709 - 0.879)
Disability in laundry (0-2)	-0.192	0.825	(0.786 - 0.867)
Disability in shopping (0-3)	-0.056 ^a	0.945	(0.907 - 0.986)
Disability in telephone use (0-5)	-0.031 ^a	0.970	(0.950 - 0.989)
Prior (2 weeks ago) disability in grooming (0-3)	-0.054 ^a	0.947	(0.915 - 0.981)
Prior (2 weeks ago) disability in transportation (0-2)	-0.170	0.844	(0.792 - 0.899)
Prior (2 weeks ago) disability in housekeeping (0-4)	-0.033 ^a	0.967	(0.946 - 0.989)
Prior (2 weeks ago) disability in shopping (0-3)	-0.064	0.938	(0.903 - 0.974)
Acute condition: terminal (0-1)	-0.396	0.673	(0.596 - 0.760)
Acute condition: contagious/communicable disease (0-1)	-0.236 ^a	0.790	(0.668 - 0.935)
Acute condition: oxygen therapy (0-1)	-0.203	0.816	(0.766 - 0.869)
Chronic condition: eating disability (0-1)	-0.376	0.687	(0.603 - 0.783)
Diagnosis: neoplasms (0-1)	-0.295	0.745	(0.696 - 0.797)
Diagnosis: nervous system disorder (0-1)	-0.102	0.903	(0.847 - 0.963)
Diagnosis: genitourinary system diseases (0-1)	-0.112	0.894	(0.838 - 0.953)
Diagnosis: skin/subcutaneous diseases (0-1)	-0.208	0.812	(0.746 - 0.885)
Diagnosis: other injury (0-1)	-0.136	0.873	(0.803 - 0.949)
Length of stay: more than 62 days (0-1)	-0.338	0.713	(0.664 - 0.766)
Constant	3.125		

Number of Risk Factors: 38

Developmental Sample $R^2 = 0.114^{\S}$

Validation Sample $R^2 = 0.116^{\S}$

Developmental Sample C-statistic = 0.786[§]

Validation Sample C-statistic = 0.789[§]

**TABLE 6: Logistic Regression Model for Predicting the Outcome of Stabilization in Bathing.
(Cont'd)**

- * SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.
- † The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.
- ‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.
- § The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]
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TABLE 7: Logistic Regression Model for Predicting the Outcome of Improvement in Toileting.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.281	1.325	(1.182 - 1.485)
Inpatient discharge from hospital (0-1)	0.434	1.544	(1.465 - 1.627)
Inpatient discharge from rehab. facility (0-1)	0.422	1.525	(1.415 - 1.643)
Inpatient discharge from nursing home (0-1)	0.286	1.331	(1.228 - 1.443)
Moderate or better recovery prognosis (0-1)	0.230	1.258	(1.150 - 1.376)
Good functional status rehabilitation prognosis (0-1)	0.249	1.282	(1.207 - 1.362)
Gender: female (0-1)	-0.072 ^a	0.931	(0.887 - 0.978)
Patient lives with family member (0-1)	0.177	1.194	(1.102 - 1.293)
Patient lives alone (0-1)	0.350	1.419	(1.289 - 1.562)
Patient has unpaid live-in help (0-1)	0.171	1.187	(1.093 - 1.289)
Vision impairment (0-2)	-0.058 ^a	0.943	(0.905 - 0.983)
Speech/language impairment (0-5)	-0.088	0.916	(0.886 - 0.946)
Stage of most problematic pressure ulcer (0-4)	-0.173	0.841	(0.810 - 0.873)
Status of most problematic stasis ulcer (0-3)	-0.183	0.833	(0.775 - 0.896)
Surgical wound(s) present (0-1)	0.223	1.250	(1.133 - 1.379)
Number of surgical wounds present (0-4)	0.089	1.093	(1.035 - 1.155)
Urinary catheter (0-1)	-0.383	0.682	(0.605 - 0.768)
Urinary incontinence severity 1 (0-4)	-0.060	0.942	(0.918 - 0.966)
Bowel ostomy (0-1)	-0.426	0.653	(0.551 - 0.774)
Bowel incontinence frequency (0-5)	-0.133	0.876	(0.856 - 0.896)
Demonstrated behavior: verbal disruption (0-1)	-0.196 ^a	0.822	(0.708 - 0.955)
Disability in cognitive functioning (0-4)	-0.046 ^a	0.955	(0.924 - 0.987)
Disability in grooming (0-3)	-0.062	0.940	(0.906 - 0.974)
Disability in dressing upper body (0-3)	-0.191	0.826	(0.790 - 0.864)
Disability in toileting (0-4)	0.743	2.102	(2.013 - 2.195)
Disability in transferring (0-5)	-0.232	0.793	(0.764 - 0.823)
Disability in ambulation (0-5)	-0.258	0.773	(0.749 - 0.797)
Disability in eating (0-5)	-0.068	0.935	(0.900 - 0.970)
Disability in light meal preparation (0-2)	-0.121	0.886	(0.844 - 0.930)
Disability in mgt. of oral medications (0-2)	-0.148	0.863	(0.829 - 0.898)
Disability in transportation (0-2)	-0.203	0.816	(0.746 - 0.893)
Disability in telephone use (0-5)	-0.077	0.926	(0.910 - 0.943)
Prior (2 weeks ago) disability in dressing lower body (0-3)	-0.079	0.924	(0.888 - 0.962)
Prior (2 weeks ago) disability in bathing (0-5)	-0.076	0.927	(0.902 - 0.951)
Prior (2 weeks ago) disability in toileting (0-4)	-0.162	0.851	(0.819 - 0.884)
Prior (2 weeks ago) disability in housekeeping (0-4)	-0.067	0.935	(0.914 - 0.957)
Acute condition: terminal (0-1)	-0.319	0.727	(0.641 - 0.825)
Acute condition: enteral/parenteral nutrition (0-1)	-0.257 ^a	0.774	(0.656 - 0.913)
Chronic condition: urinary incontinence/catheter (0-1)	-0.094 ^a	0.911	(0.851 - 0.974)
Diagnosis: neoplasms (0-1)	-0.194	0.823	(0.757 - 0.896)
Diagnosis: blood diseases (0-1)	-0.101 ^b	0.904	(0.828 - 0.987)
Diagnosis: mental disease (0-1)	-0.100 ^a	0.905	(0.842 - 0.972)
Diagnosis: nervous system disorder (0-1)	-0.222	0.801	(0.754 - 0.851)
Diagnosis: genitourinary system diseases (0-1)	-0.167	0.846	(0.792 - 0.905)
Diagnosis: other injury (0-1)	-0.164	0.849	(0.772 - 0.933)
Length of stay: more than 31 days (0-1)	0.328	1.389	(1.327 - 1.454)
Constant	0.976		

TABLE 7: Logistic Regression Model for Predicting the Outcome of Improvement in Toileting. (Cont'd)

Number of Risk Factors: 46

Developmental Sample $R^2 = 0.267^{\S}$

Validation Sample $R^2 = 0.262^{\S}$

Developmental Sample C-statistic = 0.800^{\S}

Validation Sample C-statistic = 0.797^{\S}

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

† The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.

‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.

§ The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]

TABLE 8: Logistic Regression Model for Predicting the Outcome of Improvement in Transferring.

This model is comprised of three logistic regression submodels that predict the outcome of Improvement in Transferring for patients in three distinct subpopulations defined by their health status at start or resumption of care (SOC/ROC):

The first submodel predicts this outcome for patients who are at level 3, level 4 or level 5 on the Transferring scale at SOC/ROC.

The second submodel predicts this outcome for patients who are at level 2 on the Transferring scale at SOC/ROC.

The third submodel predicts this outcome for patients who are at level 1 on the Transferring scale at SOC/ROC.

Risk factors, coefficients, odds ratios, and confidence intervals for odds ratios are presented below for each of the three submodels. Thereafter, summary statistics provide information on the total number of unique risk factors (because some risk factors appear in more than one submodel) and the explanatory power of the overall model that results from combining the submodels.

Submodel 1: For Improvement in Transferring restricted to patients who are at level 3, level 4 or level 5 on the Transferring scale at SOC/ROC.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Inpatient discharge from hospital (0-1)	0.422	1.525	(1.392 - 1.670)
Inpatient discharge from rehab. facility (0-1)	0.432	1.540	(1.299 - 1.825)
Inpatient discharge from nursing home (0-1)	0.489	1.630	(1.371 - 1.938)
Good functional status rehabilitation prognosis (0-1)	0.190	1.210	(1.106 - 1.323)
Obesity at SOC (0-1)	-0.267	0.766	(0.677 - 0.866)
Vision impairment (0-2)	-0.071 ^b	0.931	(0.868 - 0.998)
Status of most problematic pressure ulcer (0-3)	-0.076 ^a	0.927	(0.873 - 0.984)
Urinary incontinence severity 1 (0-4)	-0.135	0.873	(0.844 - 0.903)
Bowel incontinence frequency (0-5)	-0.053	0.949	(0.922 - 0.976)
Disability in dressing lower body (0-3)	-0.222	0.801	(0.720 - 0.891)
Disability in toileting (0-4)	-0.162	0.851	(0.806 - 0.897)
Disability in transferring (0-5)	0.441	1.554	(1.437 - 1.680)
Disability in ambulation (0-5)	-0.221	0.802	(0.742 - 0.866)
Disability in transportation (0-2)	-0.215	0.807	(0.734 - 0.886)
Prior (2 weeks ago) disability in transferring (0-5)	-0.170	0.844	(0.791 - 0.901)
Prior (2 weeks ago) disability in eating (0-5)	-0.090	0.914	(0.866 - 0.965)
Prior (2 weeks ago) disability in ambulation (0-5)	-0.147	0.863	(0.807 - 0.924)
Acute condition: terminal (0-1)	-0.535	0.586	(0.492 - 0.697)
Acute condition: gastrointestinal disorder (0-1)	-0.213	0.808	(0.708 - 0.922)
Acute condition: enteral/parenteral nutrition (0-1)	-0.345	0.708	(0.592 - 0.848)
Diagnosis: neoplasms (0-1)	-0.248 ^a	0.780	(0.650 - 0.936)
Diagnosis: nervous system disorder (0-1)	-0.367	0.693	(0.631 - 0.761)
Diagnosis: skin/subcutaneous diseases (0-1)	-0.397	0.673	(0.584 - 0.775)
Length of stay: more than 31 days (0-1)	0.522	1.685	(1.548 - 1.835)
Constant	2.071		

Number of Risk Factors: 24

TABLE 8: Logistic Regression Model for Predicting the Outcome of Improvement in Transferring. (Cont'd)

Submodel 2: For Improvement in Transferring restricted to patients who are at level 2 on the Transferring scale at SOC/ROC.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.290	1.337	(1.114 - 1.605)
Inpatient discharge from hospital (0-1)	0.391	1.479	(1.363 - 1.604)
Inpatient discharge from rehab. facility (0-1)	0.466	1.594	(1.410 - 1.802)
Inpatient discharge from nursing home (0-1)	0.405	1.499	(1.316 - 1.707)
Urinary catheter prior to past 2 weeks (0-1)	-0.466	0.627	(0.503 - 0.782)
Good functional status rehabilitation prognosis (0-1)	0.404	1.497	(1.383 - 1.621)
Patient lives alone (0-1)	0.142 ^b	1.153	(1.008 - 1.318)
Speech/language impairment (0-5)	-0.153	0.858	(0.825 - 0.893)
Stage of most problematic pressure ulcer (0-4)	-0.219	0.803	(0.763 - 0.846)
Surgical wound(s) present (0-1)	0.306	1.358	(1.218 - 1.514)
Urinary incontinence severity 1 (0-4)	-0.080	0.923	(0.898 - 0.948)
Demonstrated behavior: verbal disruption (0-1)	-0.391	0.677	(0.552 - 0.829)
Disability in dressing upper body (0-3)	-0.178	0.837	(0.784 - 0.894)
Disability in toileting (0-4)	-0.111	0.895	(0.866 - 0.926)
Disability in ambulation (0-5)	-0.377	0.686	(0.652 - 0.721)
Disability in transportation (0-2)	-0.151 ^a	0.860	(0.767 - 0.964)
Disability in telephone use (0-5)	-0.049	0.952	(0.930 - 0.976)
Prior (2 weeks ago) disability in dressing lower body (0-3)	-0.068 ^a	0.934	(0.884 - 0.987)
Prior (2 weeks ago) disability in eating (0-5)	-0.105	0.900	(0.853 - 0.950)
Prior (2 weeks ago) disability in ambulation (0-5)	-0.130	0.878	(0.833 - 0.925)
Acute condition: terminal (0-1)	-0.459	0.632	(0.530 - 0.754)
Chronic condition: impaired ambulation/mobility (0-1)	-0.447	0.640	(0.565 - 0.724)
Diagnosis: neoplasms (0-1)	-0.355	0.701	(0.610 - 0.805)
Diagnosis: endocrine/nutritional/metabolic (0-1)	-0.161	0.851	(0.785 - 0.923)
Length of stay: more than 31 days (0-1)	0.528	1.695	(1.575 - 1.824)
Constant	2.578		

Number of Risk Factors: 25

Submodel 3: For Improvement in Transferring restricted to patients who are at level 1 on the Transferring scale at SOC/ROC.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.193	1.213	(1.136 - 1.295)
Inpatient discharge from hospital (0-1)	0.302	1.352	(1.315 - 1.390)
Inpatient discharge from rehab. facility (0-1)	0.260	1.297	(1.251 - 1.344)
Inpatient discharge from nursing home (0-1)	0.156	1.168	(1.121 - 1.218)
Moderate or better recovery prognosis (0-1)	0.235	1.265	(1.187 - 1.349)
Good functional status rehabilitation prognosis (0-1)	0.237	1.268	(1.222 - 1.315)
Obesity at SOC (0-1)	-0.199	0.820	(0.793 - 0.848)
Drug dependency at SOC (0-1)	-0.131 ^a	0.877	(0.790 - 0.974)
Age (in years)	-0.010	0.990	(0.989 - 0.991)

TABLE 8: Logistic Regression Model for Predicting the Outcome of Improvement in Transferring. (Cont'd)

Submodel 3: For Improvement in Transferring restricted to patients who are at level 1 on the Transferring scale at SOC/ROC. (Cont'd)

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Patient lives with family member (0-1)	0.155	1.167	(1.119 - 1.218)
Patient lives alone (0-1)	0.168	1.183	(1.129 - 1.239)
Vision impairment (0-2)	-0.083	0.920	(0.898 - 0.943)
Hearing impairment (0-4)	-0.033	0.968	(0.950 - 0.986)
Speech/language impairment (0-5)	-0.032 ^a	0.969	(0.949 - 0.989)
Stage 1-4 pressure ulcer(s) present (0-1)	-0.243	0.784	(0.733 - 0.838)
Status of most problematic stasis ulcer (0-3)	-0.095	0.909	(0.877 - 0.943)
Number of surgical wounds present (0-4)	0.162	1.176	(1.156 - 1.196)
Dyspnea (0-4)	-0.026	0.974	(0.964 - 0.985)
Urinary incontinence severity 2 (0-4)	-0.041	0.959	(0.948 - 0.971)
Urinary tract infection (0-1)	-0.072	0.930	(0.892 - 0.971)
Bowel incontinence frequency (0-5)	-0.021 ^b	0.979	(0.960 - 0.998)
Depression scale (0-5)	-0.030 ^a	0.971	(0.949 - 0.993)
Disability in grooming (0-3)	-0.048	0.953	(0.936 - 0.970)
Disability in dressing lower body (0-3)	-0.069	0.934	(0.918 - 0.949)
Disability in bathing (0-5)	-0.039	0.962	(0.951 - 0.973)
Disability in toileting (0-4)	-0.068	0.935	(0.916 - 0.953)
Disability in ambulation (0-5)	-0.269	0.764	(0.747 - 0.783)
Disability in eating (0-5)	-0.057	0.944	(0.923 - 0.966)
Disability in mgt. of oral medications (0-2)	-0.037	0.964	(0.942 - 0.987)
Disability in telephone use (0-5)	-0.046	0.955	(0.943 - 0.967)
Prior (2 weeks ago) disability in transferring (0-5)	-0.294	0.745	(0.727 - 0.765)
Prior (2 weeks ago) disability in laundry (0-2)	-0.086	0.918	(0.892 - 0.944)
Prior (2 weeks ago) disability in housekeeping (0-4)	-0.015 ^b	0.985	(0.971 - 1.000)
Prior (2 weeks ago) disability in shopping (0-3)	-0.029	0.971	(0.954 - 0.989)
Acute condition: open wound/lesion (0-1)	-0.047 ^a	0.954	(0.924 - 0.985)
Acute condition: terminal (0-1)	-0.145	0.865	(0.795 - 0.942)
Acute condition: diabetes mellitus (0-1)	-0.095	0.910	(0.874 - 0.947)
Acute condition: IV/Infusion therapy (0-1)	-0.228	0.796	(0.730 - 0.868)
Chronic condition: urinary incontinence/catheter (0-1)	-0.130	0.878	(0.841 - 0.917)
Chronic condition: dependence in medication admin. (0-1)	-0.067	0.935	(0.904 - 0.967)
Diagnosis: blood diseases (0-1)	-0.068	0.935	(0.896 - 0.975)
Diagnosis: nervous system disorder (0-1)	-0.133	0.875	(0.842 - 0.910)
Diagnosis: circulatory system diseases (0-1)	-0.056	0.946	(0.923 - 0.969)
Diagnosis: skin/subcutaneous diseases (0-1)	-0.209	0.811	(0.767 - 0.858)
Diagnosis: musculoskeletal system diseases (0-1)	-0.055	0.947	(0.924 - 0.970)
Diagnosis: fractures (0-1)	-0.106	0.900	(0.868 - 0.932)
Diagnosis: other injury (0-1)	-0.158	0.854	(0.812 - 0.898)
Length of stay: more than 31 days (0-1)	0.149	1.161	(1.134 - 1.189)
Constant	0.961		
Number of Risk Factors: 48			

TABLE 8: Logistic Regression Model for Predicting the Outcome of Improvement in Transferring. (Cont'd)

Number of Unique Risk Factors Across All Model Components: 65

Overall model developmental sample $R^2 = 0.137^{\S}$

Overall model developmental sample C-statistic = 0.711^{\S}

Overall model validation sample $R^2 = 0.137^{\S}$

Overall model validation sample C-statistic = 0.711^{\S}

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

† The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.

‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.

§ The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 's and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]

TABLE 9: Logistic Regression Model for Predicting the Outcome of Stabilization in Transferring.

This model is comprised of three logistic regression submodels that predict the outcome of Stabilization in Transferring for patients in three distinct subpopulations defined by their health status at start or resumption of care (SOC/ROC).

The first submodel predicts this outcome for patients who are at level 2, level 3, or level 4 on the Transferring scale at SOC/ROC.

The second submodel predicts this outcome for patients who are at level 1 on the Transferring scale at SOC/ROC.

The third submodel predicts this outcome for patients who are at level 0 on the Transferring scale at SOC/ROC.

Risk factors, coefficients, odds ratios, and confidence intervals for odds ratios are presented below for each of the three submodels. Thereafter, summary statistics provide information on the total number of unique risk factors (because some risk factors appear in more than one submodel) and the explanatory power of the overall model that results from combining the submodels.

Submodel 1: For Stabilization in Transferring restricted to patients who are at level 2, level 3, or level 4 on the Transferring scale at SOC/ROC.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Good functional status rehabilitation prognosis (0-1)	0.504	1.656	(1.430 - 1.917)
Stage of most problematic pressure ulcer (0-4)	-0.200	0.819	(0.762 - 0.879)
Urinary catheter (0-1)	-0.662	0.516	(0.426 - 0.625)
Disability in toileting (0-4)	-0.267	0.765	(0.715 - 0.820)
Disability in transferring (0-5)	0.434	1.544	(1.370 - 1.740)
Disability in ambulation (0-5)	-0.452	0.636	(0.586 - 0.691)
Disability in eating (0-5)	-0.202	0.817	(0.755 - 0.883)
Disability in transportation (0-2)	-0.402	0.669	(0.569 - 0.787)
Disability in telephone use (0-5)	-0.062 ^a	0.940	(0.900 - 0.980)
Prior (2 weeks ago) disability in grooming (0-3)	-0.254	0.776	(0.719 - 0.838)
Acute condition: terminal (0-1)	-0.339 ^a	0.712	(0.554 - 0.917)
Diagnosis: neoplasms (0-1)	-0.773	0.462	(0.369 - 0.577)
Length of stay: more than 62 days (0-1)	-0.297	0.743	(0.618 - 0.895)
Constant	4.932		

Number of Risk Factors: 13

Submodel 2: For Stabilization in Transferring restricted to patients who are at level 1 on the Transferring scale at SOC/ROC.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Inpatient discharge from hospital (0-1)	0.224	1.251	(1.108 - 1.413)
Inpatient discharge from nursing home (0-1)	0.489	1.630	(1.290 - 2.059)
Moderate or better recovery prognosis (0-1)	0.359	1.432	(1.182 - 1.734)
Good functional status rehabilitation prognosis (0-1)	0.366	1.441	(1.247 - 1.666)
Drug dependency at SOC (0-1)	-0.635	0.530	(0.362 - 0.777)

TABLE 9: Logistic Regression Model for Predicting the Outcome of Stabilization in Transferring. (Cont'd)

Submodel 2: For Stabilization in Transferring restricted to patients who are at level 1 on the Transferring Scale at SOC/ROC. (Cont'd)

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Patient lives in own home (0-1)	0.201	1.223	(1.080 - 1.383)
Stage 1-4 pressure ulcer(s) present (0-1)	-0.691	0.501	(0.420 - 0.598)
Stasis ulcer(s) present (0-1)	-0.632	0.532	(0.383 - 0.738)
Surgical wound(s) present (0-1)	0.556	1.744	(1.463 - 2.079)
Urinary incontinence severity 1 (0-4)	-0.062 ^a	0.940	(0.900 - 0.981)
Urinary tract infection (0-1)	-0.217 ^b	0.805	(0.670 - 0.968)
Depression scale (0-5)	-0.126 ^a	0.882	(0.804 - 0.966)
Disability in cognitive functioning	-0.070 ^b	0.933	(0.875 - 0.993)
Disability in dressing upper body (0-3)	-0.387	0.679	(0.618 - 0.747)
Disability in bathing (0-5)	-0.081 ^a	0.922	(0.862 - 0.987)
Disability in toileting (0-4)	-0.220	0.803	(0.753 - 0.855)
Disability in ambulation (0-5)	-0.727	0.483	(0.448 - 0.522)
Disability in eating (0-5)	-0.156	0.855	(0.786 - 0.931)
Disability in light meal preparation (0-2)	-0.152 ^a	0.859	(0.766 - 0.963)
Disability in transportation (0-2)	-0.872	0.418	(0.329 - 0.531)
Prior (2 weeks ago) disability in grooming (0-3)	-0.086 ^b	0.918	(0.851 - 0.990)
Prior (2 weeks ago) disability in shopping (0-3)	-0.246	0.782	(0.726 - 0.842)
Acute condition: terminal (0-1)	-0.667	0.514	(0.409 - 0.644)
Diagnosis: neoplasms (0-1)	-0.905	0.405	(0.343 - 0.478)
Length of stay: more than 62 days (0-1)	-0.415	0.660	(0.556 - 0.784)
Constant	7.187		

Number of Risk Factors: 25

Submodel 3: For Stabilization in Transferring restricted to patients who are at level 0 on the Transferring scale at SOC/ROC.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Good functional status rehabilitation prognosis (0-1)	0.208	1.231	(1.135 - 1.336)
Obesity at SOC (0-1)	-0.197	0.822	(0.750 - 0.900)
Age (in years)	-0.018	0.982	(0.980 - 0.985)
Vision impairment (0-2)	-0.116	0.891	(0.835 - 0.950)
Hearing impairment (0-4)	-0.056 ^b	0.945	(0.901 - 0.992)
Pain interfering with activity (0-3)	-0.054	0.947	(0.918 - 0.977)
Status of most problematic pressure ulcer (0-3)	-0.136	0.873	(0.808 - 0.943)
Number of surgical wounds present (0-4)	0.209	1.232	(1.187 - 1.279)
Dyspnea (0-4)	-0.054	0.948	(0.922 - 0.975)
Urinary incontinence severity 2 (0-4)	-0.047	0.955	(0.933 - 0.976)
Urinary tract infection (0-1)	-0.132 ^b	0.876	(0.770 - 0.996)
Disability in grooming (0-3)	-0.056 ^b	0.945	(0.900 - 0.993)
Disability in dressing lower body (0-3)	-0.116	0.890	(0.854 - 0.928)
Disability in toileting (0-4)	-0.125	0.882	(0.821 - 0.948)
Disability in ambulation (0-5)	-0.632	0.532	(0.506 - 0.559)
Disability in light meal preparation (0-2)	-0.077	0.926	(0.885 - 0.969)
ADL assistance provided by caregiver (0-1)	-0.147	0.863	(0.806 - 0.924)

TABLE 9: Logistic Regression Model for Predicting the Outcome of Stabilization in Transferring. (Cont'd)

Submodel 3: For Stabilization in Transferring restricted to patients who are at level 0 on the Transferring scale at SOC/ROC. (Cont'd)

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Prior (2 weeks ago) disability in bathing (0-5)	-0.051	0.951	(0.926 - 0.976)
Prior (2 weeks ago) disability in shopping (0-3)	-0.160	0.852	(0.824 - 0.882)
Acute condition: orthopedic (0-1)	-0.317	0.728	(0.676 - 0.784)
Acute condition: terminal (0-1)	-0.358	0.699	(0.574 - 0.851)
Chronic condition: chronic pain (0-1)	-0.168 ^b	0.845	(0.733 - 0.975)
Diagnosis: genitourinary system diseases (0-1)	-0.121 ^b	0.886	(0.796 - 0.985)
Diagnosis: skin/subcutaneous diseases (0-1)	-0.223	0.800	(0.709 - 0.903)
Diagnosis: other injury (0-1)	-0.157 ^a	0.855	(0.758 - 0.963)
Length of stay: more than 31 days (0-1)	-0.182	0.834	(0.783 - 0.887)
Constant	4.405		

Number of Risk Factors: 26

Number of Unique Risk Factors Across All Model Components: 48

Overall model developmental sample $R^2 = 0.118^{\S}$

Overall model developmental sample C-statistic = 0.846[§]

Overall model validation sample $R^2 = 0.110^{\S}$

Overall model validation sample C-statistic = 0.840[§]

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

† The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.

‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.

§ The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 's and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]

TABLE 10: Logistic Regression Model for Predicting the Outcome of Improvement in Ambulation/Locomotion.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Inpatient discharge from hospital (0-1)	0.249	1.283	(1.237 - 1.331)
Medical regimen change in past 14 days (0-1)	0.157	1.170	(1.118 - 1.224)
Urinary catheter prior to past 2 weeks (0-1)	-0.299	0.742	(0.669 - 0.822)
Moderate or better recovery prognosis (0-1)	0.154	1.166	(1.122 - 1.212)
Good functional status rehabilitation prognosis (0-1)	0.341	1.407	(1.273 - 1.554)
Obesity at SOC (0-1)	-0.154	0.858	(0.816 - 0.901)
Age (in years)	-0.003	0.997	(0.995 - 0.998)
Gender: female (0-1)	-0.085	0.919	(0.890 - 0.949)
Patient lives in own home (0-1)	0.056	1.058	(1.045 - 1.072)
Patient lives with family member (0-1)	0.136	1.146	(1.123 - 1.169)
Patient has unpaid live-in help (0-1)	0.117	1.125	(1.025 - 1.234)
Vision impairment (0-2)	-0.060	0.941	(0.843 - 1.051)
Speech/language impairment (0-5)	-0.033 ^a	0.968	(0.939 - 0.998)
Stage of most problematic pressure ulcer (0-4)	-0.208	0.812	(0.802 - 0.823)
Stasis ulcer(s) present (0-1)	-0.268	0.765	(0.741 - 0.790)
Number of surgical wounds present (0-4)	0.182	1.199	(1.161 - 1.239)
Urinary incontinence severity 1 (0-4)	-0.062	0.940	(0.913 - 0.968)
Urinary tract infection (0-1)	-0.124	0.883	(0.849 - 0.919)
Bowel incontinence frequency (0-5)	-0.100	0.905	(0.859 - 0.953)
Disability in bathing (0-5)	-0.076	0.927	(0.907 - 0.947)
Disability in transferring (0-5)	-0.561	0.571	(0.551 - 0.591)
Disability in ambulation (0-5)	1.786	5.964	(5.318 - 6.688)
Disability in transportation (0-2)	-0.320	0.726	(0.716 - 0.737)
Disability in telephone use (0-5)	-0.021 ^a	0.979	(0.911 - 1.053)
Prior (2 weeks ago) disability in ambulation (0-5)	-0.588	0.555	(0.535 - 0.576)
Acute condition: orthopedic (0-1)	-0.168	0.845	(0.808 - 0.884)
Acute condition: open wound/lesion (0-1)	-0.114	0.892	(0.855 - 0.932)
Acute condition: terminal (0-1)	-0.151 ^a	0.860	(0.840 - 0.880)
Acute condition: diabetes mellitus (0-1)	-0.074 ^a	0.928	(0.906 - 0.951)
Acute condition: oxygen therapy (0-1)	-0.045 ^b	0.956	(0.888 - 1.029)
Acute condition: IV/Infusion therapy (0-1)	-0.157 ^a	0.855	(0.811 - 0.901)
Chronic condition: eating disability (0-1)	-0.215	0.807	(0.784 - 0.831)
Diagnosis: blood diseases (0-1)	-0.113	0.894	(0.876 - 0.911)
Diagnosis: nervous system disorder (0-1)	-0.229	0.796	(0.743 - 0.852)
Diagnosis: skin/subcutaneous diseases (0-1)	-0.217	0.805	(0.778 - 0.833)
Diagnosis: musculoskeletal system diseases (0-1)	-0.131	0.877	(0.832 - 0.925)
Length of stay: more than 31 days (0-1)	0.207	1.230	(1.173 - 1.288)
Constant	-2.036		

Number of Risk Factors: 37

Developmental Sample R² = 0.180[§]

Validation Sample R² = 0.183[§]

Developmental Sample C-statistic = 0.755[§]

Validation Sample C-statistic = 0.758[§]

TABLE 10: Logistic Regression Model for Predicting the Outcome of Improvement in Ambulation/Locomotion. (Cont'd)

- * SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.
- † The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.
- ‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.
- § The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]
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TABLE 11: Logistic Regression Model for Predicting the Outcome of Improvement in Eating.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.144 ^a	1.155	(1.035 - 1.289)
Inpatient discharge from hospital (0-1)	0.360	1.434	(1.362 - 1.510)
Inpatient discharge from rehab. facility (0-1)	0.513	1.671	(1.548 - 1.803)
Inpatient discharge from nursing home (0-1)	0.389	1.476	(1.356 - 1.606)
Impaired decision-making prior to past 2 weeks (0-1)	-0.131	0.877	(0.825 - 0.932)
Good functional status rehabilitation prognosis (0-1)	0.116	1.123	(1.064 - 1.186)
Patient lives in own home (0-1)	0.065 ^a	1.067	(1.014 - 1.124)
Patient lives alone (0-1)	0.148	1.160	(1.087 - 1.238)
Patient has unpaid live-in help (0-1)	0.236	1.266	(1.181 - 1.358)
Primary caregiver present (0-1)	-0.108 ^a	0.898	(0.834 - 0.966)
Vision impairment (0-2)	-0.169	0.845	(0.811 - 0.880)
Speech/language impairment (0-5)	-0.141	0.869	(0.844 - 0.894)
Stage of most problematic pressure ulcer (0-4)	-0.116	0.891	(0.857 - 0.926)
Surgical wound(s) present (0-1)	0.179	1.196	(1.092 - 1.310)
Number of surgical wounds present (0-4)	0.059 ^a	1.061	(1.012 - 1.112)
Dyspnea (0-4)	-0.042	0.959	(0.940 - 0.977)
Urinary incontinence severity 1 (0-4)	-0.035	0.966	(0.949 - 0.983)
Demonstrated behavior: disruptive, infant, socially inappr. (0-1)	-0.380	0.684	(0.554 - 0.845)
Disability in grooming (0-3)	-0.053 ^a	0.949	(0.914 - 0.985)
Disability in dressing upper body (0-3)	-0.069	0.934	(0.896 - 0.972)
Disability in toileting (0-4)	-0.039 ^a	0.961	(0.934 - 0.989)
Disability in transferring (0-5)	-0.130	0.878	(0.849 - 0.909)
Disability in eating (0-5)	0.952	2.590	(2.409 - 2.784)
Disability in light meal preparation (0-2)	-0.115	0.892	(0.852 - 0.933)
Disability in mgt. of oral medications (0-2)	-0.091	0.913	(0.873 - 0.955)
Disability in telephone use (0-5)	-0.071	0.932	(0.915 - 0.949)
Prior (2 weeks ago) disability in eating (0-5)	-0.252	0.778	(0.740 - 0.817)
Prior (2 weeks ago) disability in ambulation (0-5)	-0.031 ^b	0.970	(0.942 - 0.998)
Prior (2 weeks ago) disability in housekeeping (0-4)	-0.092	0.912	(0.893 - 0.931)
Acute condition: terminal (0-1)	-0.340	0.712	(0.630 - 0.804)
Acute condition: enteral/parenteral nutrition (0-1)	-1.755	0.173	(0.144 - 0.208)
Chronic condition: dependence in medication admin. (0-1)	-0.068 ^b	0.935	(0.873 - 1.001)
Diagnosis: neoplasms (0-1)	-0.276	0.759	(0.701 - 0.822)
Diagnosis: blood diseases (0-1)	-0.153	0.858	(0.788 - 0.935)
Diagnosis: nervous system disorder (0-1)	-0.197	0.821	(0.772 - 0.874)
Length of stay: more than 31 days (0-1)	0.260	1.298	(1.240 - 1.357)
Constant	-0.037 ^b		

Number of Risk Factors: 36

Developmental Sample R² = 0.176[§]

Validation Sample R² = 0.171[§]

Developmental Sample C-statistic = 0.742

Validation Sample C-statistic = 0.739[§]

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

† The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.

**TABLE 11: Logistic Regression Model for Predicting the Outcome of Improvement in Eating.
(Cont'd)**

- ‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.
- § The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]
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TABLE 12: Logistic Regression Model for Predicting the Outcome of Improvement in Light Meal Preparation.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.205	1.228	(1.132 - 1.332)
Inpatient discharge from hospital (0-1)	0.357	1.429	(1.376 - 1.484)
Inpatient discharge from rehab. facility (0-1)	0.496	1.643	(1.559 - 1.730)
Inpatient discharge from nursing home (0-1)	0.368	1.445	(1.362 - 1.533)
Moderate or better recovery prognosis (0-1)	0.220	1.246	(1.155 - 1.344)
Good functional status rehabilitation prognosis (0-1)	0.209	1.233	(1.177 - 1.291)
Age (in years)	-0.006	0.994	(0.993 - 0.996)
Gender: female (0-1)	0.204	1.226	(1.185 - 1.268)
Patient lives in own home (0-1)	0.277	1.319	(1.269 - 1.371)
Patient lives with family member (0-1)	0.266	1.304	(1.226 - 1.388)
Patient lives alone (0-1)	0.603	1.828	(1.707 - 1.958)
Patient has unpaid live-in help (0-1)	0.403	1.496	(1.409 - 1.589)
Infrequency of caregiver assistance (1-7)	-0.014 ^a	0.986	(0.976 - 0.996)
Vision impairment (0-2)	-0.091	0.913	(0.885 - 0.941)
Speech/language impairment (0-5)	-0.076	0.927	(0.903 - 0.951)
Stage 1-4 pressure ulcer(s) present (0-1)	-0.230	0.795	(0.732 - 0.863)
Stasis ulcer(s) present (0-1)	-0.257	0.774	(0.689 - 0.868)
Surgical wound(s) present (0-1)	0.399	1.491	(1.434 - 1.549)
Urinary incontinence severity 1 (0-4)	-0.051	0.950	(0.938 - 0.963)
Confusion scale (0-4)	-0.098	0.907	(0.888 - 0.926)
Behavior problem frequency (0-5)	-0.025	0.975	(0.960 - 0.991)
Disability in grooming (0-3)	-0.070	0.932	(0.909 - 0.956)
Disability in dressing upper body (0-3)	-0.118	0.889	(0.866 - 0.912)
Disability in toileting (0-4)	-0.110	0.896	(0.875 - 0.918)
Disability in transferring (0-5)	-0.086	0.918	(0.891 - 0.946)
Disability in ambulation (0-5)	-0.170	0.844	(0.822 - 0.866)
Disability in eating (0-5)	-0.075	0.928	(0.901 - 0.956)
Disability in light meal preparation (0-2)	1.309	3.704	(3.533 - 3.882)
Disability in mgt. of oral medications (0-2)	-0.312	0.732	(0.712 - 0.752)
Disability in housekeeping (0-4)	-0.103	0.903	(0.884 - 0.922)
Disability in telephone use (0-5)	-0.102	0.903	(0.890 - 0.917)
ADL assistance provided by caregiver (0-1)	-0.102	0.903	(0.867 - 0.941)
Prior (2 weeks ago) disability in light meal preparation (0-2)	-0.120	0.887	(0.849 - 0.927)
Prior (2 weeks ago) disability in transportation (0-2)	-0.073	0.930	(0.889 - 0.973)
Prior (2 weeks ago) disability in laundry (0-2)	-0.083	0.921	(0.882 - 0.961)
Prior (2 weeks ago) disability in housekeeping (0-4)	-0.025 ^b	0.975	(0.952 - 0.999)
Prior (2 weeks ago) disability in shopping (0-3)	-0.027 ^b	0.973	(0.949 - 0.999)
Acute condition: terminal (0-1)	-0.178	0.837	(0.755 - 0.929)
Acute condition: oxygen therapy (0-1)	-0.173	0.842	(0.803 - 0.882)
Acute condition: IV/Infusion therapy (0-1)	-0.180	0.835	(0.751 - 0.929)
Acute condition: enteral/parenteral nutrition (0-1)	-0.368	0.692	(0.601 - 0.796)
Chronic condition: dependence in living skills (0-1)	-0.262	0.769	(0.722 - 0.820)
Chronic condition: cognitive/mental/behavioral problems (0-1)	-0.086	0.918	(0.875 - 0.964)
Diagnosis: neoplasms (0-1)	-0.273	0.761	(0.722 - 0.803)
Diagnosis: mental disease (0-1)	-0.106	0.900	(0.852 - 0.950)
Diagnosis: nervous system disorder (0-1)	-0.151	0.860	(0.818 - 0.903)
Diagnosis: genitourinary system diseases (0-1)	-0.120	0.887	(0.845 - 0.931)
Diagnosis: skin/subcutaneous diseases (0-1)	-0.178	0.837	(0.779 - 0.900)
Diagnosis: other injury (0-1)	-0.108	0.898	(0.841 - 0.959)
Length of stay: more than 31 days (0-1)	0.296	1.345	(1.303 - 1.388)
Constant	-1.122		

TABLE 12: Logistic Regression Model for Predicting the Outcome of Improvement in Light Meal Preparation. (Cont'd)

Number of Risk Factors: 50

Developmental Sample $R^2 = 0.267^{\S}$

Validation Sample $R^2 = 0.261^{\S}$

Developmental Sample C-statistic = 0.797[§]

Validation Sample C-statistic = 0.794[§]

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

† The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.

‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.

§ The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]

TABLE 13: Logistic Regression Model for Predicting the Outcome of Stabilization in Light Meal Preparation.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.138 ^b	1.147	(1.013 - 1.300)
Inpatient discharge from hospital (0-1)	0.157	1.170	(1.103 - 1.241)
Inpatient discharge from rehab. facility (0-1)	0.283	1.327	(1.215 - 1.448)
Inpatient discharge from nursing home (0-1)	0.311	1.364	(1.234 - 1.508)
Memory loss requiring supervision prior to past 2 weeks (0-1)	-0.147 ^a	0.864	(0.768 - 0.972)
Moderate or better recovery prognosis (0-1)	0.365	1.440	(1.279 - 1.621)
Good functional status rehabilitation prognosis (0-1)	0.127	1.136	(1.054 - 1.224)
Age (in years)	-0.015	0.985	(0.983 - 0.988)
Gender: female (0-1)	0.311	1.365	(1.293 - 1.441)
Patient lives in own home (0-1)	0.316	1.372	(1.285 - 1.465)
Patient lives with family member (0-1)	0.273	1.314	(1.184 - 1.459)
Patient lives alone (0-1)	0.763	2.145	(1.915 - 2.404)
Patient has unpaid live-in help (0-1)	0.318	1.375	(1.254 - 1.508)
Infrequency of caregiver assistance (1-7)	-0.061	0.941	(0.926 - 0.956)
Status of most problematic pressure ulcer (0-3)	-0.163	0.850	(0.807 - 0.894)
Number of stasis ulcers present (0-4)	-0.081 ^a	0.922	(0.863 - 0.984)
Surgical wound(s) present (0-1)	0.329	1.389	(1.302 - 1.482)
Bowel incontinence frequency (0-5)	-0.043 ^b	0.958	(0.919 - 0.998)
Confusion scale (0-4)	-0.094	0.910	(0.878 - 0.943)
Disability in grooming (0-3)	-0.070 ^a	0.933	(0.892 - 0.976)
Disability in dressing upper body (0-3)	-0.159	0.853	(0.810 - 0.898)
Disability in dressing lower body (0-3)	-0.051 ^a	0.951	(0.912 - 0.992)
Disability in toileting (0-4)	-0.148	0.862	(0.823 - 0.903)
Disability in transferring (0-5)	-0.103	0.902	(0.856 - 0.951)
Disability in ambulation (0-5)	-0.178	0.837	(0.800 - 0.875)
Disability in eating (0-5)	-0.082 ^a	0.921	(0.871 - 0.975)
Disability in light meal preparation (0-2)	1.492	4.447	(4.171 - 4.741)
Disability in mgt. of oral medications (0-2)	-0.368	0.692	(0.661 - 0.725)
Disability in laundry (0-2)	-0.072 ^a	0.931	(0.877 - 0.988)
Disability in housekeeping (0-4)	-0.092	0.912	(0.885 - 0.940)
Disability in telephone use (0-5)	-0.083	0.921	(0.895 - 0.948)
ADL assistance provided by caregiver (0-1)	-0.181	0.834	(0.782 - 0.890)
Prior (2 weeks ago) disability in transportation (0-2)	-0.212	0.809	(0.756 - 0.866)
Prior (2 weeks ago) disability in housekeeping (0-4)	-0.095	0.909	(0.889 - 0.930)
Acute condition: neurologic (0-1)	-0.154	0.857	(0.786 - 0.934)
Acute condition: terminal (0-1)	-0.346	0.707	(0.600 - 0.833)
Acute condition: contagious/communicable disease (0-1)	-0.242 ^a	0.785	(0.642 - 0.961)
Acute condition: oxygen therapy (0-1)	-0.191	0.826	(0.765 - 0.892)
Acute condition: IV/Infusion therapy (0-1)	-0.246	0.782	(0.670 - 0.913)
Acute condition: enteral/parenteral nutrition (0-1)	-0.361 ^a	0.697	(0.538 - 0.902)
Chronic condition: cognitive/mental/behavioral problems (0-1)	-0.148	0.862	(0.788 - 0.944)
Diagnosis: neoplasms (0-1)	-0.338	0.713	(0.657 - 0.774)
Diagnosis: genitourinary system diseases (0-1)	-0.123	0.884	(0.818 - 0.956)
Length of stay: more than 62 days (0-1)	-0.315	0.730	(0.668 - 0.797)
Constant	2.577		

TABLE 13: Logistic Regression Model for Predicting the Outcome of Stabilization in Light Meal Preparation. (Cont'd)

Number of Risk Factors:	44	
Developmental Sample $R^2 = 0.118^{\S}$		Validation Sample $R^2 = 0.109^{\S}$
Developmental Sample C-statistic = 0.777^{\S}		Validation Sample C-statistic = 0.771^{\S}

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

† The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.

‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.

§ The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]

TABLE 14: Logistic Regression Model for Predicting the Outcome of Improvement in Laundry.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.154	1.167	(1.088 - 1.251)
Inpatient discharge from hospital (0-1)	0.292	1.339	(1.293 - 1.386)
Inpatient discharge from rehab. facility (0-1)	0.331	1.392	(1.329 - 1.457)
Inpatient discharge from nursing home (0-1)	0.242	1.274	(1.206 - 1.345)
Medical regimen change in past 14 days (0-1)	0.107	1.113	(1.070 - 1.158)
Moderate or better recovery prognosis (0-1)	0.253	1.288	(1.189 - 1.394)
Good functional status rehabilitation prognosis (0-1)	0.333	1.395	(1.332 - 1.462)
Obesity at SOC (0-1)	-0.071	0.931	(0.894 - 0.970)
Age (in years)	-0.011	0.989	(0.988 - 0.991)
Gender: female (0-1)	0.224	1.251	(1.212 - 1.290)
Patient lives in own home (0-1)	0.202	1.224	(1.178 - 1.272)
Patient lives with family member (0-1)	0.267	1.306	(1.223 - 1.394)
Patient lives alone (0-1)	0.482	1.619	(1.510 - 1.735)
Patient has unpaid live-in help (0-1)	0.253	1.288	(1.217 - 1.362)
Infrequency of caregiver assistance (1-7)	-0.022	0.978	(0.970 - 0.987)
Vision impairment (0-2)	-0.064	0.938	(0.910 - 0.968)
Stage 1-4 pressure ulcer(s) present (0-1)	-0.371	0.690	(0.641 - 0.744)
Stasis ulcer(s) present (0-1)	-0.273	0.761	(0.689 - 0.840)
Surgical wound(s) present (0-1)	0.263	1.301	(1.259 - 1.344)
Urinary incontinence severity 2 (0-4)	-0.046	0.955	(0.945 - 0.965)
Bowel incontinence frequency (0-5)	-0.027 ^b	0.973	(0.949 - 0.998)
Confusion scale (0-4)	-0.065	0.937	(0.917 - 0.958)
Disability in grooming (0-3)	-0.055	0.946	(0.924 - 0.970)
Disability in dressing upper body (0-3)	-0.110	0.896	(0.871 - 0.921)
Disability in dressing lower body (0-3)	-0.026 ^b	0.975	(0.952 - 0.997)
Disability in bathing (0-5)	-0.052	0.949	(0.937 - 0.962)
Disability in toileting (0-4)	-0.087	0.917	(0.893 - 0.940)
Disability in transferring (0-5)	-0.088	0.916	(0.889 - 0.943)
Disability in ambulation (0-5)	-0.208	0.812	(0.792 - 0.833)
Disability in light meal preparation (0-2)	-0.163	0.849	(0.829 - 0.870)
Disability in mgt. of oral medications (0-2)	-0.223	0.800	(0.780 - 0.821)
Disability in laundry (0-2)	2.349	10.475	(9.951 - 11.027)
Disability in housekeeping (0-4)	-0.087	0.917	(0.899 - 0.935)
Disability in shopping (0-3)	-0.087	0.917	(0.891 - 0.943)
Disability in telephone use (0-5)	-0.131	0.877	(0.862 - 0.892)
ADL assistance provided by caregiver (0-1)	-0.145	0.865	(0.834 - 0.897)
Prior (2 weeks ago) disability in transportation (0-2)	-0.079	0.924	(0.889 - 0.960)
Prior (2 weeks ago) disability in laundry (0-2)	-0.300	0.741	(0.713 - 0.770)
Prior (2 weeks ago) disability in housekeeping (0-4)	-0.058	0.944	(0.925 - 0.963)
Prior (2 weeks ago) disability in shopping (0-3)	-0.031 ^b	0.970	(0.945 - 0.995)
Acute condition: oxygen therapy (0-1)	-0.242	0.785	(0.750 - 0.821)
Acute condition: enteral/parenteral nutrition (0-1)	-0.158 ^b	0.854	(0.746 - 0.977)
Chronic condition: cognitive/mental/behavioral problems (0-1)	-0.061 ^a	0.941	(0.896 - 0.989)
Diagnosis: neoplasms (0-1)	-0.218	0.804	(0.767 - 0.842)
Diagnosis: nervous system disorder (0-1)	-0.144	0.866	(0.824 - 0.910)
Diagnosis: genitourinary system diseases (0-1)	-0.141	0.869	(0.831 - 0.909)
Diagnosis: fractures (0-1)	-0.058 ^a	0.944	(0.902 - 0.988)
Length of stay: more than 31 days (0-1)	0.326	1.385	(1.346 - 1.426)
Constant	-3.517		

TABLE 14: Logistic Regression Model for Predicting the Outcome of Improvement in Laundry. (Cont'd)

Number of Risk Factors:	48		
Developmental Sample $R^2 = 0.264^{\S}$		Validation Sample $R^2 = 0.262^{\S}$	
Developmental Sample C-statistic = 0.805^{\S}		Validation Sample C-statistic = 0.804^{\S}	

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

† The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.

‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.

§ The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]

TABLE 15: Logistic Regression Model for Predicting the Outcome of Stabilization in Laundry.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Memory loss requiring supervision prior to past 2 weeks (0-1)	-0.318	0.728	(0.647 - 0.819)
Moderate or better recovery prognosis (0-1)	0.231	1.260	(1.107 - 1.435)
Good functional status rehabilitation prognosis (0-1)	0.273	1.314	(1.220 - 1.415)
Age (in years)	-0.015	0.985	(0.983 - 0.987)
Gender: female (0-1)	0.304	1.355	(1.288 - 1.426)
Patient lives in own home (0-1)	0.201	1.223	(1.144 - 1.307)
Patient lives alone (0-1)	0.299	1.349	(1.274 - 1.428)
Patient has unpaid live-in help (0-1)	0.134	1.143	(1.056 - 1.238)
Infrequency of caregiver assistance (1-7)	-0.058	0.944	(0.931 - 0.956)
Stage 1-4 pressure ulcer(s) present (0-1)	-0.218	0.804	(0.711 - 0.909)
Status of surgical wound (0-3)	0.082	1.085	(1.052 - 1.119)
Bowel incontinence frequency (0-5)	-0.072 ^a	0.931	(0.888 - 0.976)
Disability in grooming (0-3)	-0.063 ^a	0.939	(0.896 - 0.985)
Disability in dressing lower body (0-3)	-0.084	0.919	(0.887 - 0.953)
Disability in bathing (0-5)	-0.058	0.944	(0.925 - 0.962)
Disability in toileting (0-4)	-0.170	0.844	(0.797 - 0.894)
Disability in ambulation (0-5)	-0.139	0.870	(0.835 - 0.907)
Disability in light meal preparation (0-2)	-0.281	0.755	(0.720 - 0.792)
Disability in mgt. of oral medications (0-2)	-0.249	0.780	(0.738 - 0.823)
Disability in laundry (0-2)	2.034	7.642	(7.193 - 8.118)
Disability in housekeeping (0-4)	-0.149	0.862	(0.842 - 0.882)
ADL assistance provided by caregiver (0-1)	-0.141	0.869	(0.816 - 0.924)
Prior (2 weeks ago) disability in transportation (0-2)	-0.216	0.806	(0.759 - 0.855)
Prior (2 weeks ago) disability in shopping (0-3)	-0.094	0.910	(0.882 - 0.939)
Acute condition: oxygen therapy (0-1)	-0.272	0.762	(0.702 - 0.827)
Acute condition: ventilator (0-1)	-1.110 ^a	0.329	(0.132 - 0.823)
Total number of acute conditions reported (0-16)	-0.030 ^a	0.971	(0.948 - 0.994)
Chronic condition: dependence in medication admin. (0-1)	-0.081 ^b	0.922	(0.861 - 0.988)
Chronic condition: chronic pain (0-1)	-0.110 ^b	0.896	(0.806 - 0.996)
Diagnosis: neoplasms (0-1)	-0.247	0.781	(0.724 - 0.843)
Diagnosis: nervous system disorder (0-1)	-0.142	0.868	(0.800 - 0.942)
Diagnosis: genitourinary system diseases (0-1)	-0.121	0.886	(0.822 - 0.956)
Diagnosis: fractures (0-1)	-0.118 ^a	0.889	(0.814 - 0.970)
Length of stay: more than 62 days (0-1)	-0.312	0.732	(0.671 - 0.798)
Constant	1.396		

Number of Risk Factors: 34

Developmental Sample $R^2 = 0.133^{\S}$

Validation Sample $R^2 = 0.129^{\S}$

Developmental Sample C-statistic = 0.752^{\S}

Validation Sample C-statistic = 0.746^{\S}

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

† The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.

**TABLE 15: Logistic Regression Model for Predicting the Outcome of Stabilization in Laundry.
(Cont'd)**

- ‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.
- § The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]
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TABLE 16: Logistic Regression Model for Predicting the Outcome of Improvement in Housekeeping.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.183	1.201	(1.146 - 1.259)
Inpatient discharge from hospital (0-1)	0.300	1.349	(1.318 - 1.381)
Inpatient discharge from rehab. facility (0-1)	0.396	1.486	(1.439 - 1.533)
Inpatient discharge from nursing home (0-1)	0.307	1.359	(1.310 - 1.410)
Medical regimen change in past 14 days (0-1)	0.072	1.075	(1.047 - 1.104)
Memory loss requiring supervision prior to past 2 weeks (0-1)	-0.155	0.856	(0.824 - 0.890)
Moderate or better recovery prognosis (0-1)	0.281	1.325	(1.259 - 1.394)
Good functional status rehabilitation prognosis (0-1)	0.269	1.309	(1.270 - 1.348)
Obesity at SOC (0-1)	-0.047	0.954	(0.927 - 0.981)
Age (in years)	-0.010	0.990	(0.989 - 0.991)
Gender: female (0-1)	0.195	1.216	(1.191 - 1.241)
Patient lives in own home (0-1)	0.136	1.146	(1.117 - 1.175)
Patient lives with family member (0-1)	0.258	1.294	(1.241 - 1.348)
Patient lives alone (0-1)	0.436	1.546	(1.478 - 1.616)
Patient has unpaid live-in help (0-1)	0.212	1.236	(1.192 - 1.282)
Infrequency of caregiver assistance (1-7)	-0.017	0.983	(0.977 - 0.989)
Vision impairment (0-2)	-0.079	0.924	(0.905 - 0.943)
Stage of most problematic pressure ulcer (0-4)	-0.091	0.913	(0.890 - 0.936)
Stasis ulcer(s) present (0-1)	-0.221	0.802	(0.747 - 0.860)
Surgical wound(s) present (0-1)	0.245	1.277	(1.234 - 1.322)
Dyspnea (0-4)	-0.023	0.978	(0.968 - 0.987)
Urinary incontinence severity 1 (0-4)	-0.047	0.954	(0.946 - 0.961)
Depression scale (0-5)	-0.022 ^b	0.979	(0.961 - 0.997)
Demonstrated behavior: verbal disruption (0-1)	-0.230	0.794	(0.715 - 0.882)
Disability in grooming (0-3)	-0.056	0.945	(0.930 - 0.961)
Disability in dressing upper body (0-3)	-0.115	0.891	(0.876 - 0.907)
Disability in bathing (0-5)	-0.042	0.959	(0.951 - 0.968)
Disability in toileting (0-4)	-0.121	0.886	(0.872 - 0.901)
Disability in transferring (0-5)	-0.089	0.915	(0.898 - 0.933)
Disability in ambulation (0-5)	-0.190	0.827	(0.814 - 0.841)
Disability in eating (0-5)	-0.031	0.970	(0.951 - 0.989)
Disability in light meal preparation (0-2)	-0.218	0.804	(0.790 - 0.818)
Disability in mgt. of oral medications (0-2)	-0.173	0.841	(0.827 - 0.856)
Disability in housekeeping (0-4)	1.042	2.836	(2.800 - 2.872)
Disability in shopping (0-3)	-0.193	0.825	(0.809 - 0.841)
Disability in telephone use (0-5)	-0.104	0.901	(0.892 - 0.910)
ADL assistance provided by caregiver (0-1)	-0.068	0.934	(0.911 - 0.958)
Prior (2 weeks ago) disability in laundry (0-2)	-0.123	0.884	(0.863 - 0.905)
Prior (2 weeks ago) disability in housekeeping (0-4)	-0.179	0.836	(0.825 - 0.848)
Prior (2 weeks ago) disability in shopping (0-3)	-0.021 ^a	0.979	(0.963 - 0.996)
Acute condition: open wound/lesion (0-1)	-0.072	0.930	(0.901 - 0.961)
Acute condition: terminal (0-1)	-0.110	0.896	(0.836 - 0.960)
Acute condition: pulmonary (0-1)	-0.032 ^b	0.969	(0.941 - 0.997)
Acute condition: diabetes mellitus (0-1)	-0.045 ^a	0.957	(0.926 - 0.988)
Acute condition: oxygen therapy (0-1)	-0.267	0.765	(0.740 - 0.791)
Acute condition: IV/Infusion therapy (0-1)	-0.064 ^b	0.938	(0.882 - 0.998)
Acute condition: enteral/parenteral nutrition (0-1)	-0.177	0.838	(0.763 - 0.921)
Diagnosis: neoplasms (0-1)	-0.193	0.824	(0.798 - 0.852)
Diagnosis: nervous system disorder (0-1)	-0.113	0.894	(0.865 - 0.923)
Diagnosis: genitourinary system diseases (0-1)	-0.076	0.927	(0.899 - 0.955)

TABLE 16: Logistic Regression Model for Predicting the Outcome of Improvement in Housekeeping. (Cont'd)

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Diagnosis: skin/subcutaneous diseases (0-1)	-0.092	0.912	(0.873 - 0.953)
Length of stay: more than 31 days (0-1)	0.291	1.337	(1.311 - 1.364)
Constant	-2.219		

Number of Risk Factors: 52

Developmental Sample $R^2 = 0.263^{\S}$ Validation Sample $R^2 = 0.262^{\S}$

Developmental Sample C-statistic = 0.798^{\S} Validation Sample C-statistic = 0.798^{\S}

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

† The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.

‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.

§ The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]

TABLE 17: Logistic Regression Model for Predicting the Outcome of Stabilization in Housekeeping.

This model is comprised of three logistic regression submodels that predict the outcome of Stabilization in Housekeeping for patients in three distinct subpopulations defined by their health status at start or resumption of care (SOC/ROC).

The first submodel predicts this outcome for patients who are at level 3 on the Housekeeping scale at SOC/ROC.

The second submodel predicts this outcome for patients who are at level 2 on the Housekeeping scale at SOC/ROC.

The third submodel predicts this outcome for patients who are at level 1 or level 0 on the Housekeeping scale at SOC/ROC.

Risk factors, coefficients, odds ratios, and confidence intervals for odds ratios are presented below for each of the three submodels. Thereafter, summary statistics provide information on the total number of unique risk factors (because some risk factors appear in more than one submodel) and the explanatory power of the overall model that results from combining the submodels.

Submodel 1: For Stabilization in Housekeeping restricted to patients who are at level 3 on the Housekeeping scale at SOC/ROC.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.209 ^a	1.232	(1.069 - 1.420)
Good functional status rehabilitation prognosis (0-1)	0.296	1.344	(1.251 - 1.445)
Age (in years)	-0.012	0.988	(0.985 - 0.991)
Gender: female (0-1)	0.262	1.300	(1.226 - 1.377)
Patient lives in own home (0-1)	0.081 ^b	1.085	(1.011 - 1.163)
Patient lives with family member (0-1)	0.175	1.191	(1.069 - 1.328)
Patient lives alone (0-1)	0.393	1.482	(1.315 - 1.669)
Patient has unpaid live-in help (0-1)	0.198	1.219	(1.102 - 1.349)
Infrequency of caregiver assistance (1-7)	-0.027 ^a	0.974	(0.957 - 0.991)
Stage 1-4 pressure ulcer(s) present (0-1)	-0.241	0.786	(0.680 - 0.908)
Stasis ulcer(s) present (0-1)	-0.221 ^b	0.802	(0.666 - 0.965)
Surgical wound(s) present (0-1)	0.290	1.336	(1.249 - 1.430)
Bowel incontinence frequency (0-5)	-0.055 ^a	0.947	(0.909 - 0.987)
Disability in grooming (0-3)	-0.066 ^a	0.937	(0.896 - 0.979)
Disability in dressing upper body (0-3)	-0.143	0.867	(0.828 - 0.908)
Disability in toileting (0-4)	-0.142	0.868	(0.829 - 0.908)
Disability in ambulation (0-5)	-0.179	0.837	(0.801 - 0.874)
Disability in light meal preparation (0-2)	-0.176	0.839	(0.798 - 0.882)
Disability in mgt. of oral medications (0-2)	-0.251	0.778	(0.743 - 0.815)
Disability in shopping (0-3)	-0.133	0.875	(0.831 - 0.922)
Disability in telephone use (0-5)	-0.061	0.941	(0.916 - 0.967)
ADL assistance provided by caregiver (0-1)	-0.133	0.876	(0.816 - 0.939)
Prior (2 weeks ago) disability in laundry (0-2)	-0.232	0.793	(0.763 - 0.823)
Acute condition: terminal (0-1)	-0.379	0.685	(0.575 - 0.815)
Acute condition: oxygen therapy (0-1)	-0.282	0.754	(0.695 - 0.818)
Acute condition: enteral/parenteral nutrition (0-1)	-0.416	0.660	(0.521 - 0.837)
Acute condition: ventilator (0-1)	-0.879 ^b	0.415	(0.185 - 0.930)
Chronic condition: dependence in personal care (0-1)	-0.078 ^b	0.925	(0.863 - 0.992)
Diagnosis: neoplasms (0-1)	-0.352	0.703	(0.644 - 0.769)

TABLE 17: Logistic Regression Model for Predicting the Outcome of Stabilization in Housekeeping. (Cont'd)

Submodel 1: For Stabilization in Housekeeping restricted to patients who are at level 3 on the Housekeeping scale at SOC/ROC. (Cont'd)

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Diagnosis: nervous system disorder (0-1)	-0.146	0.864	(0.794 - 0.941)
Diagnosis: genitourinary system diseases (0-1)	-0.106 ^a	0.900	(0.827 - 0.979)
Diagnosis: skin/subcutaneous diseases (0-1)	-0.178 ^a	0.837	(0.739 - 0.948)
Length of stay: more than 62 days (0-1)	-0.294	0.745	(0.677 - 0.820)
Constant	3.111		

Number of Risk Factors: 33

Submodel 2: For Stabilization in Housekeeping restricted to patients who are at level 2 on the Housekeeping scale at SOC/ROC.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Inpatient discharge from rehab. facility (0-1)	0.193 ^a	1.213	(1.039 - 1.417)
Memory loss requiring supervision prior to past 2 weeks (0-1)	-0.309	0.734	(0.610 - 0.883)
Moderate or better recovery prognosis (0-1)	0.404	1.498	(1.172 - 1.914)
Good functional status rehabilitation prognosis (0-1)	0.162 ^b	1.176	(1.016 - 1.361)
Age (in years)	-0.012	0.988	(0.984 - 0.992)
Gender: female (0-1)	0.303	1.354	(1.222 - 1.499)
Patient lives in own home (0-1)	0.209	1.233	(1.089 - 1.396)
Patient lives with family member (0-1)	0.242 ^a	1.273	(1.060 - 1.530)
Patient lives alone (0-1)	0.459	1.582	(1.293 - 1.936)
Stage 2-4 pressure ulcer(s) present (0-1)	-0.279 ^b	0.757	(0.579 - 0.989)
Surgical wound(s) present (0-1)	0.272	1.313	(1.166 - 1.478)
Bowel incontinence frequency (0-5)	-0.121 ^a	0.886	(0.812 - 0.968)
Disability in grooming (0-3)	-0.211	0.810	(0.753 - 0.870)
Disability in bathing (0-5)	-0.065 ^a	0.937	(0.896 - 0.979)
Disability in toileting (0-4)	-0.168	0.845	(0.770 - 0.928)
Disability in ambulation (0-5)	-0.126 ^a	0.882	(0.813 - 0.957)
Disability in light meal preparation (0-2)	-0.213	0.808	(0.742 - 0.880)
Disability in mgt. of oral medications (0-2)	-0.246	0.782	(0.719 - 0.851)
Disability in laundry (0-2)	-0.127 ^a	0.881	(0.803 - 0.966)
Disability in telephone use (0-5)	-0.066 ^b	0.936	(0.884 - 0.992)
ADL assistance provided by caregiver (0-1)	-0.126 ^a	0.882	(0.795 - 0.978)
Prior (2 weeks ago) disability in shopping (0-3)	-0.184	0.832	(0.791 - 0.875)
Acute condition: oxygen therapy (0-1)	-0.524	0.592	(0.511 - 0.686)
Diagnosis: neoplasms (0-1)	-0.322	0.725	(0.619 - 0.849)
Diagnosis: endocrine/nutritional/metabolic (0-1)	-0.142 ^a	0.868	(0.784 - 0.961)
Diagnosis: other injury (0-1)	-0.216 ^b	0.806	(0.668 - 0.971)
Length of stay: more than 124 days (0-1)	-0.493 ^a	0.611	(0.420 - 0.889)
Constant	2.442		

Number of Risk Factors: 27

TABLE 17: Logistic Regression Model for Predicting the Outcome of Stabilization in Housekeeping. (Cont'd)

Submodel 3: For Stabilization in Housekeeping restricted to patients who are at level 1 or level 0 on the Housekeeping scale at SOC/ROC.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Inpatient discharge from rehab. facility (0-1)	0.142	1.152	(1.064 - 1.248)
Inpatient discharge from nursing home (0-1)	0.217	1.242	(1.131 - 1.365)
Memory loss requiring supervision prior to past 2 weeks (0-1)	-0.223	0.800	(0.697 - 0.918)
Moderate or better recovery prognosis (0-1)	0.195 ^a	1.215	(1.061 - 1.392)
Good functional status rehabilitation prognosis (0-1)	0.289	1.335	(1.239 - 1.440)
Age (in years)	-0.013	0.988	(0.986 - 0.989)
Gender: female (0-1)	0.234	1.263	(1.201 - 1.329)
Patient lives in own home (0-1)	0.163	1.177	(1.100 - 1.259)
Patient lives alone (0-1)	0.230	1.259	(1.189 - 1.332)
Patient has unpaid live-in help (0-1)	0.180	1.197	(1.104 - 1.298)
Infrequency of caregiver assistance (1-7)	-0.046	0.955	(0.943 - 0.968)
Vision impairment (0-2)	-0.101	0.904	(0.855 - 0.955)
Stage 1-4 pressure ulcer(s) present (0-1)	-0.473	0.623	(0.553 - 0.703)
Status of most problematic stasis ulcer (0-3)	-0.064 ^b	0.938	(0.888 - 0.991)
Urinary tract infection (0-1)	-0.165	0.848	(0.774 - 0.928)
Bowel incontinence frequency (0-5)	-0.107	0.899	(0.855 - 0.945)
Demonstrated behavior: memory deficit (0-1)	-0.161 ^a	0.851	(0.748 - 0.969)
Disability in dressing upper body (0-3)	-0.187	0.829	(0.795 - 0.866)
Disability in toileting (0-4)	-0.091 ^a	0.913	(0.858 - 0.972)
Disability in ambulation (0-5)	-0.173	0.841	(0.807 - 0.877)
Disability in eating (0-5)	-0.088 ^a	0.916	(0.863 - 0.971)
Disability in light meal preparation (0-2)	-0.257	0.774	(0.738 - 0.811)
Disability in mgt. of oral medications (0-2)	-0.267	0.766	(0.732 - 0.801)
Disability in laundry (0-2)	-0.125	0.882	(0.836 - 0.931)
Disability in housekeeping (0-4)	2.013	7.488	(6.909 - 8.115)
Disability in shopping (0-3)	-0.059 ^a	0.943	(0.906 - 0.982)
ADL assistance provided by caregiver (0-1)	-0.079 ^a	0.924	(0.868 - 0.983)
Prior (2 weeks ago) disability in transportation (0-2)	-0.190	0.827	(0.777 - 0.880)
Prior (2 weeks ago) disability in laundry (0-2)	-0.104	0.901	(0.856 - 0.949)
Prior (2 weeks ago) disability in shopping (0-3)	-0.073	0.929	(0.892 - 0.968)
Acute condition: oxygen therapy (0-1)	-0.371	0.690	(0.639 - 0.745)
Diagnosis: neoplasms (0-1)	-0.207	0.813	(0.754 - 0.876)
Diagnosis: nervous system disorder (0-1)	-0.108 ^a	0.898	(0.827 - 0.975)
Length of stay: more than 31 days (0-1)	-0.156	0.856	(0.815 - 0.898)
Constant	0.986		

Number of Risk Factors: 34

Number of Unique Risk Factors Across All Model Components: 52

Overall model developmental sample $R^2 = 0.110^S$

Overall model developmental sample C-statistic = 0.721^S

Overall model validation sample $R^2 = 0.100^S$

Overall model validation sample C-statistic = 0.713^S

TABLE 17: Logistic Regression Model for Predicting the Outcome of Stabilization in Housekeeping. (Cont'd)

- * SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.
- † The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.
- ‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.
- § The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]
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TABLE 18: Logistic Regression Model for Predicting the Outcome of Improvement in Shopping.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.159	1.172	(1.097 - 1.251)
Inpatient discharge from hospital (0-1)	0.299	1.349	(1.306 - 1.393)
Inpatient discharge from rehab. facility (0-1)	0.353	1.424	(1.364 - 1.486)
Inpatient discharge from nursing home (0-1)	0.251	1.285	(1.223 - 1.350)
Medical regimen change in past 14 days (0-1)	0.083	1.087	(1.048 - 1.126)
Memory loss requiring supervision prior to past 2 weeks (0-1)	-0.164	0.849	(0.798 - 0.903)
Moderate or better recovery prognosis (0-1)	0.325	1.384	(1.294 - 1.480)
Good functional status rehabilitation prognosis (0-1)	0.266	1.304	(1.252 - 1.359)
Age (in years)	-0.013	0.988	(0.986 - 0.989)
Gender: female (0-1)	-0.068	0.935	(0.909 - 0.962)
Patient lives in own home (0-1)	0.181	1.199	(1.158 - 1.242)
Patient lives with family member (0-1)	0.115	1.121	(1.059 - 1.187)
Patient lives alone (0-1)	0.161	1.175	(1.105 - 1.249)
Patient has unpaid live-in help (0-1)	0.165	1.179	(1.121 - 1.240)
Infrequency of caregiver assistance (1-7)	-0.020	0.980	(0.973 - 0.988)
Vision impairment (0-2)	-0.088	0.916	(0.890 - 0.941)
Speech/language impairment (0-5)	-0.050	0.952	(0.928 - 0.976)
Status of most problematic pressure ulcer (0-3)	-0.141	0.869	(0.843 - 0.894)
Number of stasis ulcers present (0-4)	-0.154	0.857	(0.822 - 0.894)
Surgical wound(s) present (0-1)	0.246	1.279	(1.240 - 1.319)
Urinary incontinence severity 2 (0-4)	-0.035	0.966	(0.957 - 0.975)
Demonstrated behavior: Memory deficit (0-1)	-0.113	0.894	(0.842 - 0.948)
Demonstrated behavior: verbal disruption (0-1)	-0.383	0.682	(0.586 - 0.793)
Disability in cognitive functioning	-0.076	0.927	(0.899 - 0.955)
Confusion scale (0-4)	-0.056	0.946	(0.926 - 0.966)
Disability in grooming (0-3)	-0.062	0.940	(0.919 - 0.962)
Disability in dressing upper body (0-3)	-0.049	0.953	(0.931 - 0.975)
Disability in bathing (0-5)	-0.061	0.941	(0.929 - 0.952)
Disability in toileting (0-4)	-0.085	0.918	(0.898 - 0.939)
Disability in transferring (0-5)	-0.101	0.904	(0.881 - 0.927)
Disability in ambulation (0-5)	-0.133	0.876	(0.856 - 0.896)
Disability in light meal preparation (0-2)	-0.152	0.859	(0.840 - 0.879)
Disability in mgt. of oral medications (0-2)	-0.144	0.866	(0.845 - 0.887)
Disability in shopping (0-3)	1.569	4.800	(4.659 - 4.945)
Disability in telephone use (0-5)	-0.123	0.884	(0.863 - 0.906)
ADL assistance provided by caregiver (0-1)	-0.074	0.929	(0.897 - 0.962)
Prior (2 weeks ago) disability in transportation (0-2)	-0.069	0.933	(0.900 - 0.967)
Prior (2 weeks ago) disability in shopping (0-3)	-0.054	0.948	(0.935 - 0.960)
Prior (2 weeks ago) disability in telephone use (0-5)	-0.237	0.789	(0.771 - 0.808)
Acute condition: oxygen therapy (0-1)	-0.037 ^a	0.964	(0.940 - 0.988)
Acute condition: enteral/parenteral nutrition (0-1)	-0.206	0.814	(0.781 - 0.848)
Diagnosis: neoplasms (0-1)	-0.244	0.784	(0.696 - 0.882)
Diagnosis: mental disease (0-1)	-0.192	0.826	(0.790 - 0.863)
Diagnosis: nervous system disorder (0-1)	-0.052 ^b	0.949	(0.905 - 0.996)
Diagnosis: genitourinary system diseases (0-1)	-0.068 ^a	0.935	(0.894 - 0.976)
Diagnosis: other injury (0-1)	-0.105	0.900	(0.864 - 0.938)
Length of stay: more than 31 days (0-1)	0.297	1.345	(1.309 - 1.382)
Constant	-2.473		

Number of Risk Factors: 47

Developmental Sample R² = 0.226[§]Validation Sample R² = 0.221[§]

**TABLE 18: Logistic Regression Model for Predicting the Outcome of Improvement in Shopping.
(Cont'd)**

Developmental Sample C-statistic = 0.775[§] Validation Sample C-statistic = 0.771[§]

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

† The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.

‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.

§ The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]

TABLE 19: Logistic Regression Model for Predicting the Outcome of Stabilization in Shopping.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Memory loss requiring supervision prior to past 2 weeks (0-1)	-0.120 ^b	0.887	(0.800 - 0.985)
Moderate or better recovery prognosis (0-1)	0.271	1.311	(1.165 - 1.475)
Good functional status rehabilitation prognosis (0-1)	0.114 ^a	1.121	(1.041 - 1.207)
Age (in years)	-0.017	0.983	(0.981 - 0.985)
Patient lives in own home (0-1)	0.181	1.198	(1.128 - 1.273)
Patient lives alone (0-1)	0.146	1.157	(1.085 - 1.234)
Infrequency of caregiver assistance (1-7)	-0.040	0.961	(0.948 - 0.973)
Stage 2-4 pressure ulcer(s) present (0-1)	-0.339	0.713	(0.634 - 0.800)
Number of stasis ulcers present (0-4)	-0.090 ^a	0.914	(0.854 - 0.977)
Surgical wound(s) present (0-1)	0.209	1.233	(1.123 - 1.354)
Number of surgical wounds present (0-4)	0.071 ^a	1.073	(1.022 - 1.127)
Presence of urinary incontinence (0-1)	-0.065 ^b	0.937	(0.882 - 0.995)
Bowel incontinence frequency (0-5)	-0.041 ^b	0.960	(0.923 - 0.997)
Confusion scale (0-4)	-0.100	0.905	(0.874 - 0.936)
Disability in grooming (0-3)	-0.097	0.908	(0.870 - 0.946)
Disability in dressing upper body (0-3)	-0.160	0.852	(0.816 - 0.890)
Disability in toileting (0-4)	-0.044 ^b	0.957	(0.917 - 0.998)
Disability in transferring (0-5)	-0.086	0.918	(0.874 - 0.963)
Disability in ambulation (0-5)	-0.130	0.878	(0.843 - 0.915)
Disability in light meal preparation (0-2)	-0.133	0.876	(0.838 - 0.916)
Disability in mgt. of oral medications (0-2)	-0.278	0.757	(0.725 - 0.791)
Disability in transportation (0-2)	-0.309	0.734	(0.654 - 0.824)
Disability in housekeeping (0-4)	-0.043 ^a	0.958	(0.931 - 0.987)
Disability in shopping (0-3)	1.576	4.833	(4.577 - 5.104)
Disability in telephone use (0-5)	-0.119	0.888	(0.864 - 0.912)
Prior (2 weeks ago) disability in laundry (0-2)	-0.188	0.828	(0.783 - 0.876)
Prior (2 weeks ago) disability in housekeeping (0-4)	-0.047 ^a	0.954	(0.924 - 0.985)
Acute condition: terminal (0-1)	-0.233 ^a	0.793	(0.677 - 0.928)
Acute condition: contagious/communicable disease (0-1)	-0.237 ^b	0.789	(0.645 - 0.966)
Acute condition: oxygen therapy (0-1)	-0.173	0.841	(0.781 - 0.906)
Acute condition: enteral/parenteral nutrition (0-1)	-0.373	0.689	(0.560 - 0.848)
Diagnosis: neoplasms (0-1)	-0.434	0.648	(0.600 - 0.701)
Length of stay: more than 62 days (0-1)	-0.208	0.812	(0.745 - 0.884)
Constant	1.885		

Number of Risk Factors: 33

Developmental Sample $R^2 = 0.120^{\S}$

Validation Sample $R^2 = 0.117^{\S}$

Developmental Sample C-statistic = 0.776^{\S}

Validation Sample C-statistic = 0.769^{\S}

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

† The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.

**TABLE 19: Logistic Regression Model for Predicting the Outcome of Stabilization in Shopping.
(Cont'd)**

- ‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.
- § The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]
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TABLE 20: Logistic Regression Model for Predicting the Outcome of Improvement in Phone Use.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.251	1.286	(1.198 - 1.380)
Inpatient discharge from hospital (0-1)	0.368	1.444	(1.406 - 1.484)
Inpatient discharge from rehab. facility (0-1)	0.532	1.702	(1.630 - 1.778)
Inpatient discharge from nursing home (0-1)	0.342	1.408	(1.346 - 1.473)
Memory loss requiring supervision within past 2 weeks (0-1)	-0.074	0.929	(0.899 - 0.960)
Moderate functional status recovery prognosis (0-1)	0.130	1.139	(1.088 - 1.192)
Good functional status rehabilitation prognosis (0-1)	0.059	1.061	(1.028 - 1.095)
Age (in years)	-0.006	0.994	(0.993 - 0.995)
Gender: female (0-1)	0.071	1.074	(1.046 - 1.103)
Patient lives in own home (0-1)	0.185	1.204	(1.170 - 1.238)
Patient lives with family member (0-1)	0.067	1.070	(1.031 - 1.110)
Patient lives alone (0-1)	0.172	1.188	(1.129 - 1.249)
Vision impairment (0-2)	-0.150	0.861	(0.843 - 0.879)
Hearing impairment (0-4)	-0.043	0.958	(0.944 - 0.973)
Speech/language impairment (0-5)	-0.287	0.751	(0.739 - 0.762)
Status of most problematic pressure ulcer (0-3)	-0.051	0.950	(0.928 - 0.973)
Surgical wound(s) present (0-1)	0.177	1.194	(1.116 - 1.277)
Number of surgical wounds present (0-4)	0.051 ^a	1.053	(1.017 - 1.089)
Urinary incontinence severity 1 (0-4)	-0.039	0.962	(0.952 - 0.972)
Bowel incontinence frequency (0-5)	-0.051	0.950	(0.939 - 0.962)
Demonstrated behavior: verbal disruption (0-1)	-0.197	0.821	(0.763 - 0.883)
Disability in cognitive functioning (0-4)	-0.057	0.944	(0.926 - 0.963)
Confusion scale (0-4)	-0.077	0.926	(0.913 - 0.939)
Disability in toileting (0-4)	-0.044	0.958	(0.943 - 0.973)
Disability in transferring (0-5)	-0.050	0.951	(0.932 - 0.970)
Disability in ambulation (0-5)	-0.054	0.947	(0.930 - 0.965)
Disability in eating (0-5)	-0.069	0.934	(0.915 - 0.952)
Disability in mgt. of oral medications (0-2)	-0.188	0.829	(0.808 - 0.849)
Disability in telephone use (0-5)	0.407	1.502	(1.476 - 1.528)
IADL assistance provided by caregiver (0-1)	-0.040 ^b	0.961	(0.926 - 0.997)
Prior (2 weeks ago) disability in light meal preparation (0-2)	-0.078	0.925	(0.905 - 0.946)
Prior (2 weeks ago) disability in telephone use (0-5)	-0.157	0.855	(0.842 - 0.867)
Acute condition: open wound/lesion (0-1)	-0.066	0.936	(0.903 - 0.970)
Acute condition: terminal (0-1)	-0.170	0.844	(0.789 - 0.902)
Acute condition: enteral/parenteral nutrition (0-1)	-0.258	0.773	(0.710 - 0.841)
Acute condition: ventilator (0-1)	-0.576	0.562	(0.412 - 0.767)
Total number of chronic conditions reported (0-9)	-0.038	0.962	(0.951 - 0.974)
Diagnosis: neoplasms (0-1)	-0.138	0.871	(0.831 - 0.914)
Diagnosis: nervous system disorder (0-1)	-0.151	0.860	(0.833 - 0.888)
Length of stay: more than 31 days (0-1)	0.295	1.344	(1.311 - 1.377)
Constant	0.204		

Number of Risk Factors: 40

Developmental Sample $R^2 = 0.124^{\S}$

Validation Sample $R^2 = 0.124^{\S}$

Developmental Sample C-statistic = 0.702^{\S}

Validation Sample C-statistic = 0.701^{\S}

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

**TABLE 20: Logistic Regression Model for Predicting the Outcome of Improvement in Phone Use.
(Cont'd)**

- † The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.
- ‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.
- § The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 's and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]
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TABLE 21: Logistic Regression Model for Predicting the Outcome of Stabilization in Phone Use.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.205	1.227	(1.115 - 1.351)
Inpatient discharge from hospital (0-1)	0.156	1.169	(1.126 - 1.214)
Inpatient discharge from rehab. facility (0-1)	0.179	1.195	(1.129 - 1.265)
Inpatient discharge from nursing home (0-1)	0.124	1.132	(1.064 - 1.203)
Moderate functional status recovery prognosis (0-1)	0.216	1.242	(1.162 - 1.327)
Good functional status rehabilitation prognosis (0-1)	0.089	1.093	(1.045 - 1.144)
Age (in years)	-0.024	0.977	(0.975 - 0.978)
Gender: female (0-1)	0.160	1.173	(1.132 - 1.216)
Patient lives in own home (0-1)	0.167	1.182	(1.137 - 1.228)
Patient lives alone (0-1)	0.257	1.293	(1.231 - 1.357)
Infrequency of caregiver assistance (1-7)	-0.036	0.965	(0.954 - 0.976)
Vision impairment (0-2)	-0.201	0.818	(0.792 - 0.844)
Hearing impairment (0-4)	-0.069	0.934	(0.911 - 0.957)
Speech/language impairment (0-5)	-0.309	0.734	(0.715 - 0.755)
Status of most problematic pressure ulcer (0-3)	-0.067	0.936	(0.909 - 0.963)
Surgical wound(s) present (0-1)	0.301	1.352	(1.251 - 1.460)
Number of surgical wounds present (0-4)	0.098	1.103	(1.057 - 1.150)
Urinary tract infection (0-1)	-0.086 ^a	0.917	(0.867 - 0.970)
Bowel incontinence frequency (0-5)	-0.033	0.967	(0.949 - 0.986)
Disability in cognitive functioning	-0.104	0.901	(0.873 - 0.929)
Confusion scale (0-4)	-0.112	0.894	(0.875 - 0.914)
Disability in grooming (0-3)	-0.080	0.923	(0.899 - 0.948)
Disability in dressing upper body (0-3)	-0.103	0.902	(0.877 - 0.929)
Disability in toileting (0-4)	-0.103	0.902	(0.881 - 0.924)
Disability in transferring (0-5)	-0.059	0.943	(0.915 - 0.971)
Disability in ambulation (0-5)	-0.028 ^b	0.972	(0.947 - 0.998)
Disability in eating (0-5)	-0.077	0.926	(0.899 - 0.954)
Disability in mgt. of oral medications (0-2)	-0.529	0.590	(0.572 - 0.607)
Disability in telephone use (0-5)	0.410	1.507	(1.481 - 1.534)
ADL assistance provided by caregiver (0-1)	-0.059 ^a	0.943	(0.899 - 0.988)
Prior (2 weeks ago) disability in light meal preparation (0-2)	-0.068	0.935	(0.909 - 0.961)
Prior (2 weeks ago) disability in transportation (0-2)	-0.263	0.768	(0.732 - 0.807)
Prior (2 weeks ago) disability in shopping (0-3)	-0.065	0.937	(0.916 - 0.959)
Acute condition: terminal (0-1)	-0.367	0.693	(0.634 - 0.757)
Acute condition: enteral/parenteral nutrition (0-1)	-0.349	0.705	(0.617 - 0.806)
Chronic condition: cognitive/mental/behavioral problems (0-1)	-0.191	0.826	(0.789 - 0.865)
Diagnosis: neoplasms (0-1)	-0.338	0.713	(0.675 - 0.754)
Diagnosis: mental disease (0-1)	-0.100	0.905	(0.859 - 0.953)
Diagnosis: nervous system disorder (0-1)	-0.223	0.801	(0.764 - 0.839)
Length of stay: more than 62 days (0-1)	-0.259	0.772	(0.731 - 0.814)
Constant	5.203		

Number of Risk Factors: 40

Developmental Sample $R^2 = 0.103^{\S}$

Validation Sample $R^2 = 0.104^{\S}$

Developmental Sample C-statistic = 0.803^{\S}

Validation Sample C-statistic = 0.805^{\S}

**TABLE 21: Logistic Regression Model for Predicting the Outcome of Stabilization in Phone Use.
(Cont'd)**

- * SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.
- † The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.
- ‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.
- § The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]
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TABLE 22: Logistic Regression Model for Predicting the Outcome of Improvement in Management of Oral Medications.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.218	1.244	(1.160 - 1.333)
Inpatient discharge from hospital (0-1)	0.262	1.300	(1.261 - 1.340)
Inpatient discharge from rehab. facility (0-1)	0.380	1.462	(1.402 - 1.525)
Inpatient discharge from nursing home (0-1)	0.171	1.186	(1.132 - 1.243)
Impaired decision-making within past 2 weeks (0-1)	-0.095	0.909	(0.866 - 0.954)
Moderate functional status recovery prognosis (0-1)	0.202	1.224	(1.153 - 1.299)
Good functional status rehabilitation prognosis (0-1)	0.156	1.169	(1.127 - 1.211)
Age (in years)	-0.016	0.984	(0.983 - 0.985)
Gender: female (0-1)	0.152	1.164	(1.133 - 1.196)
Patient lives in own home (0-1)	0.381	1.464	(1.418 - 1.510)
Patient lives with family member (0-1)	0.496	1.642	(1.560 - 1.728)
Patient lives alone (0-1)	0.588	1.801	(1.702 - 1.905)
Patient has unpaid live-in help (0-1)	0.208	1.231	(1.172 - 1.294)
Infrequency of caregiver assistance (1-7)	-0.032	0.968	(0.960 - 0.976)
Vision impairment (0-2)	-0.104	0.901	(0.880 - 0.923)
Speech/language impairment (0-5)	-0.092	0.913	(0.893 - 0.932)
Stage 1-4 pressure ulcer(s) present (0-1)	-0.226	0.798	(0.755 - 0.844)
Surgical wound(s) present (0-1)	0.403	1.496	(1.450 - 1.544)
Presence of urinary incontinence (0-1)	-0.044 ^b	0.957	(0.918 - 0.998)
Urinary incontinence severity 1 (0-4)	-0.036	0.965	(0.951 - 0.979)
Demonstrated behavior: memory deficit (0-1)	-0.168	0.845	(0.805 - 0.887)
Disability in cognitive functioning	-0.153	0.858	(0.838 - 0.879)
Confusion scale (0-4)	-0.131	0.877	(0.862 - 0.892)
Disability in dressing upper body (0-3)	-0.022 ^b	0.979	(0.961 - 0.997)
Disability in toileting (0-4)	-0.057	0.944	(0.926 - 0.963)
Disability in transferring (0-5)	-0.041	0.960	(0.937 - 0.983)
Disability in ambulation (0-5)	-0.099	0.906	(0.887 - 0.925)
Disability in light meal preparation (0-2)	-0.104	0.901	(0.882 - 0.921)
Disability in mgt. of oral medications (0-2)	1.564	4.777	(4.572 - 4.991)
Disability in telephone use (0-5)	-0.146	0.864	(0.854 - 0.874)
ADL assistance provided by caregiver (0-1)	-0.056	0.946	(0.914 - 0.978)
Prior (2 weeks ago) disability in transportation (0-2)	-0.098	0.906	(0.873 - 0.941)
Prior (2 weeks ago) disability in laundry (0-2)	-0.065	0.937	(0.914 - 0.962)
Prior (2 weeks ago) disability in shopping (0-3)	-0.033	0.968	(0.949 - 0.986)
Prior (2 weeks ago) disability in mgt. of oral medications (0-2)	-0.181	0.834	(0.803 - 0.866)
Acute condition: neurologic (0-1)	-0.142	0.868	(0.833 - 0.904)
Acute condition: terminal (0-1)	-0.253	0.777	(0.714 - 0.845)
Acute condition: mental/emotional (0-1)	-0.172	0.842	(0.761 - 0.933)
Acute condition: enteral/parenteral nutrition (0-1)	-0.254	0.775	(0.695 - 0.865)
Acute condition: ventilator (0-1)	-0.597 ^a	0.550	(0.344 - 0.881)
Chronic condition: eating disability (0-1)	-0.306	0.736	(0.677 - 0.800)
Chronic condition: dependence in medication admin. (0-1)	-0.442	0.643	(0.612 - 0.675)
Chronic condition: cognitive/mental/behavioral problems (0-1)	-0.135	0.873	(0.833 - 0.916)
Diagnosis: neoplasms (0-1)	-0.081	0.923	(0.881 - 0.966)
Diagnosis: endocrine/nutritional/metabolic (0-1)	-0.065	0.937	(0.912 - 0.963)
Diagnosis: mental disease (0-1)	-0.216	0.806	(0.772 - 0.841)
Diagnosis: nervous system disorder (0-1)	-0.135	0.874	(0.839 - 0.911)
Diagnosis: genitourinary system diseases (0-1)	-0.078	0.925	(0.890 - 0.961)
Diagnosis: congenital anomalies (0-1)	-0.177	0.838	(0.732 - 0.958)

TABLE 22: Logistic Regression Model for Predicting the Outcome of Improvement in Management of Oral Medications. (Cont'd)

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Diagnosis: ill-defined conditions (0-1)	-0.030	0.970	(0.945 - 0.996)
Length of stay: more than 31 days (0-1)	0.254	1.289	(1.257 - 1.323)
Constant	-1.389		

Number of Risk Factors: 51

Developmental Sample $R^2 = 0.180^{\S}$

Validation Sample $R^2 = 0.180^{\S}$

Developmental Sample C-statistic = 0.754[§]

Validation Sample C-statistic = 0.754[§]

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

† The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.

‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.

§ The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]

TABLE 23: Logistic Regression Model for Predicting the Outcome of Improvement in Dyspnea.

This model is comprised of four logistic regression submodels that predict the outcome of Improvement in Dyspnea for patients in four distinct subpopulations defined by their health status at start or resumption of care (SOC/ROC):

The first submodel predicts this outcome for patients who are at level 4 on the Dyspnea scale at SOC/ROC.

The second submodel predicts this outcome for patients who are at level 3 on the Dyspnea scale at SOC/ROC.

The third submodel predicts this outcome for patients who are at level 2 on the Dyspnea scale at SOC/ROC.

The fourth submodel predicts this outcome for patients who are at level 1 on the Dyspnea scale at SOC/ROC.

Risk factors, coefficients, odds ratios, and confidence intervals for odds ratios are presented below for each of the four submodels. Thereafter, summary statistics provide information on the total number of unique risk factors (because some risk factors appear in more than one submodel) and the explanatory power of the overall model that results from combining the submodels.

Submodel 1: For Improvement in Dyspnea restricted to patients who are at level 4 on the Dyspnea scale at SOC/ROC.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Inpatient discharge from hospital (0-1)	0.353	1.424	(1.297 - 1.563)
Inpatient discharge from rehab. facility (0-1)	0.485	1.624	(1.361 - 1.937)
Inpatient discharge from nursing home (0-1)	0.352	1.422	(1.192 - 1.697)
Medical regimen change in past 14 days (0-1)	0.155 ^a	1.168	(1.037 - 1.314)
Maximum severity rating among all diagnoses (0-4)#	-0.132	0.877	(0.832 - 0.924)
Moderate or better recovery prognosis (0-1)	0.365	1.441	(1.284 - 1.617)
Good functional status rehabilitation prognosis (0-1)	0.181	1.199	(1.088 - 1.320)
Gender: female (0-1)	0.119 ^a	1.127	(1.041 - 1.219)
Pain interfering with activity (0-3)	-0.055 ^a	0.947	(0.914 - 0.982)
Number of surgical wounds present (0-4)	0.123	1.131	(1.065 - 1.201)
Bowel incontinence frequency (0-5)	-0.059	0.943	(0.909 - 0.979)
Anxiety level (0-3)	-0.095	0.910	(0.873 - 0.948)
Prior (2 weeks ago) disability in bathing (0-5)	-0.062	0.940	(0.911 - 0.969)
Prior (2 weeks ago) disability in shopping (0-3)	-0.080	0.923	(0.880 - 0.968)
Acute condition: terminal (0-1)	-0.218	0.805	(0.702 - 0.922)
Acute condition: mental/emotional (0-1)	-0.358 ^b	0.699	(0.489 - 0.998)
Acute condition: oxygen therapy (0-1)	-0.698	0.498	(0.456 - 0.544)
Acute condition: ventilator (0-1)	-0.842	0.431	(0.281 - 0.660)
Diagnosis: blood diseases (0-1)	-0.255	0.775	(0.671 - 0.894)
Diagnosis: respiratory system diseases (0-1)	-0.245	0.782	(0.717 - 0.854)
Length of stay: more than 31 days (0-1)	0.495	1.640	(1.517 - 1.773)
Constant	1.192		

Number of Risk Factors: 21

TABLE 23: Logistic Regression Model for Predicting the Outcome of Improvement in Dyspnea. (Cont'd)

Submodel 2: For Improvement in Dyspnea restricted to patients who are at level 3 on the Dyspnea scale at SOC/ROC.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.233	1.262	(1.163 - 1.370)
Inpatient discharge from hospital (0-1)	0.395	1.484	(1.423 - 1.547)
Inpatient discharge from rehab. facility (0-1)	0.515	1.673	(1.556 - 1.799)
Inpatient discharge from nursing home (0-1)	0.427	1.533	(1.414 - 1.661)
Maximum severity rating among all diagnoses (0-4) #	-0.096	0.908	(0.885 - 0.932)
Moderate or better recovery prognosis (0-1)	0.183	1.200	(1.124 - 1.282)
Good functional status rehabilitation prognosis (0-1)	0.276	1.318	(1.260 - 1.379)
Heavy smoking at SOC (0-1)	-0.156	0.856	(0.808 - 0.907)
Obesity at SOC (0-1)	-0.129	0.879	(0.840 - 0.920)
Gender: female (0-1)	0.082	1.086	(1.045 - 1.128)
Patient lives alone (0-1)	-0.164	0.849	(0.814 - 0.885)
Vision impairment (0-2)	-0.132	0.877	(0.847 - 0.907)
Hearing impairment (0-4)	-0.034 ^a	0.966	(0.943 - 0.990)
Pain interfering with activity (0-3)	-0.033	0.968	(0.951 - 0.985)
Stasis ulcer(s) present (0-1)	-0.138 ^a	0.871	(0.776 - 0.978)
Number of surgical wounds present (0-4)	0.132	1.141	(1.114 - 1.169)
Urinary incontinence severity 1 (0-4)	-0.063	0.939	(0.926 - 0.951)
Anxiety level (0-3)	-0.066	0.937	(0.918 - 0.956)
Prior (2 weeks ago) disability in bathing (0-5)	-0.040	0.961	(0.947 - 0.976)
Prior (2 weeks ago) disability in transportation (0-2)	-0.109	0.896	(0.854 - 0.941)
Prior (2 weeks ago) disability in housekeeping (0-4)	-0.047	0.954	(0.938 - 0.971)
Acute condition: terminal (0-1)	-0.308	0.735	(0.673 - 0.802)
Acute condition: gastrointestinal disorder (0-1)	-0.075 ^a	0.928	(0.876 - 0.984)
Acute condition: oxygen therapy (0-1)	-0.709	0.492	(0.473 - 0.513)
Acute condition: IV/Infusion therapy (0-1)	-0.250	0.779	(0.694 - 0.875)
Acute condition: ventilator (0-1)	-1.184	0.306	(0.204 - 0.458)
Chronic condition: dependence in living skills (0-1)	-0.089	0.915	(0.868 - 0.965)
Diagnosis: neoplasms (0-1)	-0.202	0.817	(0.769 - 0.868)
Diagnosis: blood diseases (0-1)	-0.087	0.917	(0.861 - 0.976)
Diagnosis: respiratory system diseases (0-1)	-0.203	0.816	(0.784 - 0.850)
Diagnosis: skin/subcutaneous diseases (0-1)	-0.169	0.845	(0.790 - 0.903)
Diagnosis: other injury (0-1)	-0.181	0.834	(0.774 - 0.898)
Length of stay: more than 31 days (0-1)	0.239	1.270	(1.225 - 1.317)
Constant	0.890		

Number of Risk Factors: 32

TABLE 23: Logistic Regression Model for Predicting the Outcome of Improvement in Dyspnea. (Cont'd)

Submodel 3: For Improvement in Dyspnea restricted to patients who are at level 2 on the Dyspnea scale at SOC/ROC.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.132	1.141	(1.074 - 1.211)
Inpatient discharge from hospital (0-1)	0.286	1.331	(1.291 - 1.371)
Inpatient discharge from rehab. facility (0-1)	0.553	1.739	(1.660 - 1.822)
Inpatient discharge from nursing home (0-1)	0.411	1.508	(1.432 - 1.589)
Severity rating for primary diagnosis (0-4)	-0.073	0.930	(0.912 - 0.948)
Moderate or better recovery prognosis (0-1)	0.128	1.137	(1.071 - 1.206)
Good functional status rehabilitation prognosis (0-1)	0.230	1.259	(1.214 - 1.304)
Heavy smoking at SOC (0-1)	-0.149	0.861	(0.823 - 0.901)
Obesity at SOC (0-1)	-0.152	0.859	(0.830 - 0.889)
Patient has unpaid live-in help (0-1)	0.073	1.076	(1.032 - 1.121)
Vision impairment (0-2)	-0.168	0.845	(0.824 - 0.866)
Hearing impairment (0-4)	-0.039	0.961	(0.944 - 0.979)
Pain interfering with activity (0-3)	-0.029	0.972	(0.959 - 0.985)
Status of most problematic stasis ulcer (0-3)	-0.081	0.922	(0.891 - 0.955)
Surgical wound(s) present (0-1)	0.184	1.202	(1.143 - 1.264)
Number of surgical wounds present (0-4)	0.046	1.047	(1.023 - 1.071)
Urinary incontinence severity 1 (0-4)	-0.050	0.951	(0.942 - 0.961)
Anxiety level (0-3)	-0.071	0.931	(0.917 - 0.946)
Prior (2 weeks ago) disability in ambulation (0-5)	-0.068	0.935	(0.921 - 0.949)
Prior (2 weeks ago) disability in housekeeping (0-4)	-0.046	0.955	(0.943 - 0.967)
Prior (2 weeks ago) disability in shopping (0-3)	-0.041	0.959	(0.941 - 0.978)
Acute condition: terminal (0-1)	-0.125 ^a	0.883	(0.811 - 0.960)
Acute condition: mental/emotional (0-1)	-0.190	0.827	(0.742 - 0.922)
Acute condition: oxygen therapy (0-1)	-0.710	0.492	(0.474 - 0.510)
Acute condition: IV/Infusion therapy (0-1)	-0.295	0.745	(0.683 - 0.813)
Acute condition: ventilator (0-1)	-1.151	0.316	(0.192 - 0.522)
Chronic condition: chronic pain (0-1)	-0.103	0.902	(0.854 - 0.952)
Diagnosis: neoplasms (0-1)	-0.229	0.795	(0.761 - 0.832)
Diagnosis: endocrine/nutritional/metabolic (0-1)	-0.118	0.889	(0.865 - 0.914)
Diagnosis: circulatory system diseases (0-1)	-0.145	0.865	(0.842 - 0.889)
Diagnosis: respiratory system diseases (0-1)	-0.203	0.816	(0.791 - 0.842)
Diagnosis: skin/subcutaneous diseases (0-1)	-0.223	0.800	(0.763 - 0.839)
Diagnosis: other injury (0-1)	-0.201	0.818	(0.777 - 0.861)
Length of stay: more than 31 days (0-1)	0.111	1.118	(1.089 - 1.147)
Constant	0.555		

Number of Risk Factors: 34

TABLE 23: Logistic Regression Model for Predicting the Outcome of Improvement in Dyspnea. (Cont'd)

Submodel 4: For Improvement in Dyspnea restricted to patients who are at level 1 on the Dyspnea scale at SOC/ROC.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Inpatient discharge from hospital (0-1)	0.179	1.196	(1.163 - 1.231)
Inpatient discharge from rehab. facility (0-1)	0.421	1.524	(1.468 - 1.582)
Inpatient discharge from nursing home (0-1)	0.252	1.287	(1.232 - 1.344)
Good functional status rehabilitation prognosis (0-1)	0.205	1.227	(1.185 - 1.272)
Heavy smoking at SOC (0-1)	-0.192	0.825	(0.789 - 0.864)
Obesity at SOC (0-1)	-0.352	0.703	(0.679 - 0.728)
Age (in years)	-0.005	0.995	(0.994 - 0.996)
Gender: female (0-1)	0.041	1.042	(1.016 - 1.068)
Vision impairment (0-2)	-0.073	0.930	(0.906 - 0.954)
Hearing impairment (0-4)	-0.076	0.927	(0.909 - 0.944)
Surgical wound(s) present (0-1)	0.240	1.271	(1.237 - 1.306)
Anxiety level (0-3)	-0.089	0.915	(0.901 - 0.930)
Depression scale (0-5)	-0.038 ^a	0.963	(0.940 - 0.987)
Prior (2 weeks ago) disability in housekeeping (0-4)	-0.014 ^a	0.986	(0.975 - 0.998)
Prior (2 weeks ago) disability in shopping (0-3)	-0.054	0.948	(0.932 - 0.964)
Acute condition: terminal (0-1)	-0.235	0.790	(0.721 - 0.867)
Acute condition: cardiac/peripheral vascular (0-1)	-0.263	0.769	(0.746 - 0.793)
Acute condition: pulmonary (0-1)	-0.171	0.843	(0.801 - 0.887)
Acute condition: oxygen therapy (0-1)	-1.143	0.319	(0.302 - 0.337)
Acute condition: IV/Infusion therapy (0-1)	-0.201	0.818	(0.755 - 0.885)
Chronic condition: urinary incontinence/catheter (0-1)	-0.101	0.904	(0.875 - 0.934)
Chronic condition: dependence in medication admin. (0-1)	-0.042 ^a	0.959	(0.932 - 0.987)
Diagnosis: neoplasms (0-1)	-0.221	0.802	(0.770 - 0.834)
Diagnosis: endocrine/nutritional/metabolic (0-1)	-0.144	0.866	(0.844 - 0.889)
Diagnosis: circulatory system diseases (0-1)	-0.104	0.901	(0.875 - 0.928)
Diagnosis: respiratory system diseases (0-1)	-0.323	0.724	(0.692 - 0.758)
Diagnosis: skin/subcutaneous diseases (0-1)	-0.223	0.800	(0.763 - 0.838)
Diagnosis: other injury (0-1)	-0.208	0.812	(0.773 - 0.854)
Constant	0.262		

Number of Risk Factors: 28

Number of Unique Risk Factors Across All Model Components: 50

Overall model developmental sample $R^2 = 0.114^{\S}$

Overall model developmental sample C-statistic = 0.695[§]

Overall model validation sample $R^2 = 0.116^{\S}$

Overall model validation sample C-statistic = 0.695[§]

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

TABLE 23: Logistic Regression Model for Predicting the Outcome of Improvement in Dyspnea. (Cont'd)

- † The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.
- ‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.
- # A primary diagnosis and up to five other diagnoses are recorded for each patient at SOC/ROC. Each of the up to six diagnoses is rated according to the following five-level severity index:
- 0 - Asymptomatic, no treatment needed at this time.
 - 1 - Symptoms well controlled with current therapy.
 - 2 - Symptoms controlled with difficulty, affecting daily functioning; patient needs ongoing monitoring.
 - 3 - Symptoms poorly controlled, patients needs frequent adjustment in treatment and dose monitoring.
 - 4 - Symptoms poorly controlled, history of rehospitalizations.
- § The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]
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TABLE 24: Logistic Regression Model for Predicting the Outcome of Improvement in Urinary Tract Infection.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.263	1.300	(1.145 - 1.477)
Inpatient discharge from hospital (0-1)	0.498	1.646	(1.530 - 1.770)
Inpatient discharge from rehab. facility (0-1)	0.725	2.064	(1.844 - 2.310)
Inpatient discharge from nursing home (0-1)	0.627	1.872	(1.656 - 2.116)
Patient has unpaid live-in help (0-1)	0.124 ^a	1.132	(1.036 - 1.237)
Status of surgical wound (0-3)	0.057 ^a	1.059	(1.015 - 1.105)
Urinary catheter (0-1)	-0.736	0.479	(0.441 - 0.521)
Urinary incontinence severity 2 (0-4)	-0.033 ^a	0.968	(0.945 - 0.991)
Anxiety level (0-3)	-0.051 ^a	0.950	(0.918 - 0.984)
Prior (2 weeks ago) disability in ambulation (0-5)	-0.046	0.955	(0.933 - 0.978)
Acute condition: terminal (0-1)	-0.262	0.770	(0.663 - 0.893)
Acute condition: IV/Infusion therapy (0-1)	-1.016	0.362	(0.316 - 0.414)
Chronic condition: urinary incontinence/catheter (0-1)	-0.083 ^b	0.921	(0.848 - 0.999)
Diagnosis: infectious/parasitic disease (0-1)	-0.174 ^a	0.841	(0.746 - 0.947)
Diagnosis: genitourinary system diseases (0-1)	-0.773	0.462	(0.433 - 0.492)
Diagnosis: congenital anomalies (0-1)	-0.620	0.538	(0.419 - 0.691)
Length of stay: more than 31 days (0-1)	1.450	4.264	(3.979 - 4.570)
Constant	1.190		

Number of Risk Factors: 17

Developmental Sample $R^2 = 0.121^{\S}$

Validation Sample $R^2 = 0.120^{\S}$

Developmental Sample C-statistic = 0.740[§]

Validation Sample C-statistic = 0.742[§]

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

† The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.

‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "a." Those that are significant for $.01 < P < .05$ are superscripted by "b," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.

§ The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the predicted probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]

TABLE 25: Logistic Regression Model for Predicting the Outcome of Improvement in Urinary Incontinence.

This model is comprised of four logistic regression submodels that predict the outcome of Improvement in Urinary Incontinence for patients in four distinct subpopulations defined by their health status at start or resumption of care (SOC/ROC):

The first submodel predicts this outcome for patients who are at level 4 on the Urinary Incontinence scale at SOC/ROC.

The second submodel predicts this outcome for patients who are at level 3 on the Urinary Incontinence scale at SOC/ROC.

The third submodel predicts this outcome for patients who are at level 2 on the Urinary Incontinence scale at SOC/ROC.

The fourth submodel predicts this outcome for patients who are at level 1 on the Urinary Incontinence scale at SOC/ROC.

Risk factors, coefficients, odds ratios, and confidence intervals for odds ratios are presented below for each of the four submodels. Thereafter, summary statistics provide information on the total number of unique risk factors (because some risk factors appear in more than one submodel) and the explanatory power of the overall model that results from combining the submodels.

Submodel 1: For Improvement in Urinary Incontinence restricted to patients who are at level 4 on the Urinary Incontinence scale at SOC/ROC.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Inpatient discharge from hospital (0-1)	0.284	1.329	(1.236 - 1.429)
Urinary catheter prior to past 2 weeks (0-1)	-0.627	0.534	(0.500 - 0.571)
Moderate or better recovery prognosis (0-1)	0.235	1.264	(1.113 - 1.436)
Good functional status rehabilitation prognosis (0-1)	0.189	1.208	(1.107 - 1.318)
Gender: female (0-1)	0.381	1.464	(1.370 - 1.564)
Patient lives in own home (0-1)	0.102 ^a	1.108	(1.026 - 1.196)
Surgical wound(s) present (0-1)	0.264	1.302	(1.175 - 1.443)
Urinary tract infection (0-1)	-0.175	0.840	(0.778 - 0.906)
Bowel ostomy (0-1)	-0.681	0.506	(0.435 - 0.589)
Bowel incontinence frequency (0-5)	-0.031 ^b	0.970	(0.943 - 0.997)
Disability in ambulation (0-5)	-0.052 ^a	0.949	(0.911 - 0.989)
Prior (2 weeks ago) disability in ambulation (0-5)	-0.214	0.807	(0.777 - 0.839)
Acute condition: open wound/lesion (0-1)	-0.185	0.831	(0.754 - 0.916)
Acute condition: terminal (0-1)	-0.418	0.659	(0.557 - 0.779)
Acute condition: pulmonary (0-1)	-0.147 ^a	0.863	(0.779 - 0.957)
Acute condition: IV/Infusion therapy (0-1)	-0.653	0.520	(0.435 - 0.622)
Chronic condition: chronic pain (0-1)	-0.381	0.683	(0.586 - 0.797)
Diagnosis: endocrine/nutritional/metabolic (0-1)	-0.148	0.863	(0.800 - 0.929)
Diagnosis: nervous system disorder (0-1)	-0.574	0.563	(0.517 - 0.614)
Diagnosis: genitourinary system diseases (0-1)	-0.078 ^b	0.925	(0.863 - 0.991)
Diagnosis: skin/subcutaneous diseases (0-1)	-0.371	0.690	(0.616 - 0.772)
Length of stay: more than 31 days (0-1)	0.281	1.325	(1.240 - 1.416)
Constant	0.311		

Number of Risk Factors: 22

TABLE 25: Logistic Regression Model for Predicting the Outcome of Improvement in Urinary Incontinence. (Cont'd)

Submodel 2: For Improvement in Urinary Incontinence restricted to patients who are at level 3 on the Urinary Incontinence scale at SOC/ROC.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.172	1.188	(1.093 - 1.291)
Inpatient discharge from hospital (0-1)	0.284	1.328	(1.285 - 1.373)
Inpatient discharge from rehab. facility (0-1)	0.453	1.573	(1.495 - 1.655)
Inpatient discharge from nursing home (0-1)	0.301	1.351	(1.282 - 1.425)
Number of diagnoses with severity rating > 2 (0-6)#	-0.027	0.973	(0.963 - 0.983)
Good functional status rehabilitation prognosis (0-1)	0.111	1.117	(1.079 - 1.156)
Obesity at SOC (0-1)	-0.090	0.914	(0.877 - 0.952)
Gender: female (0-1)	-0.101	0.904	(0.873 - 0.936)
Patient lives in own home (0-1)	0.055	1.056	(1.022 - 1.092)
Patient lives with family member (0-1)	0.157	1.170	(1.134 - 1.207)
Vision impairment (0-2)	-0.048	0.953	(0.927 - 0.979)
Speech/language impairment (0-5)	-0.072	0.931	(0.911 - 0.951)
Stage of most problematic pressure ulcer (0-4)	-0.071	0.932	(0.906 - 0.959)
Surgical wound(s) present (0-1)	0.191	1.210	(1.149 - 1.274)
Dyspnea (0-4)	-0.035	0.966	(0.954 - 0.979)
Bowel ostomy (0-1)	-0.231	0.794	(0.704 - 0.896)
Bowel incontinence frequency (0-5)	-0.103	0.902	(0.891 - 0.914)
Demonstrated behavior: memory deficit (0-1)	-0.082	0.921	(0.882 - 0.961)
Demonstrated behavior: impaired decision-making (0-1)	-0.053 ^a	0.948	(0.909 - 0.989)
Disability in cognitive functioning (0-4)	-0.064	0.938	(0.914 - 0.962)
Confusion scale (0-4)	-0.041	0.960	(0.943 - 0.978)
Disability in transferring (0-5)	-0.079	0.924	(0.906 - 0.943)
Disability in eating (0-5)	-0.040 ^a	0.960	(0.935 - 0.987)
Disability in telephone use (0-5)	-0.027	0.974	(0.962 - 0.986)
Prior (2 weeks ago) disability in bathing (0-5)	-0.035	0.966	(0.952 - 0.980)
Prior (2 weeks ago) disability in toileting (0-4)	-0.048	0.953	(0.936 - 0.971)
Prior (2 weeks ago) disability in ambulation (0-5)	-0.098	0.907	(0.888 - 0.925)
Prior (2 weeks ago) disability in housekeeping (0-4)	-0.016 ^a	0.984	(0.971 - 0.997)
Acute condition: open wound/lesion (0-1)	-0.164	0.849	(0.815 - 0.884)
Acute condition: enteral/parenteral nutrition (0-1)	-0.197	0.821	(0.725 - 0.930)
Chronic condition: urinary incontinence/catheter (0-1)	-0.396	0.673	(0.651 - 0.696)
Chronic condition: chronic pain (0-1)	-0.088 ^a	0.916	(0.864 - 0.971)
Diagnosis: genitourinary system diseases (0-1)	-0.088	0.916	(0.877 - 0.957)
Length of stay: more than 31 days (0-1)	0.205	1.228	(1.191 - 1.265)
Constant	0.533		

Number of Risk Factors: 34

TABLE 25: Logistic Regression Model for Predicting the Outcome of Improvement in Urinary Incontinence. (Cont'd)

Submodel 3: For Improvement in Urinary Incontinence restricted to patients who are at level 2 on the Urinary Incontinence scale at SOC/ROC.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.325 ^a	1.385	(1.070 - 1.792)
Inpatient discharge from hospital (0-1)	0.460	1.584	(1.445 - 1.738)
Inpatient discharge from rehab. facility (0-1)	0.587	1.798	(1.567 - 2.063)
Inpatient discharge from nursing home (0-1)	0.250	1.283	(1.114 - 1.478)
Patient has unpaid live-in help (0-1)	0.287	1.332	(1.190 - 1.491)
Intractable pain (0-1)	-0.153 ^a	0.859	(0.759 - 0.971)
Dyspnea (0-4)	-0.075	0.928	(0.893 - 0.964)
Bowel incontinence frequency (0-5)	-0.128	0.880	(0.835 - 0.927)
Depression scale (0-5)	-0.087 ^a	0.917	(0.858 - 0.980)
Confusion scale (0-4)	-0.112	0.895	(0.858 - 0.932)
Disability in toileting (0-4)	-0.059 ^a	0.943	(0.899 - 0.989)
Disability in eating (0-5)	-0.099 ^a	0.906	(0.843 - 0.973)
Disability in transportation (0-2)	-0.355	0.701	(0.571 - 0.861)
Disability in telephone use (0-5)	-0.062	0.940	(0.910 - 0.971)
Prior (2 weeks ago) disability in shopping (0-3)	-0.111	0.895	(0.856 - 0.935)
Acute condition: contagious/communicable disease (0-1)	-0.725 ^a	0.484	(0.302 - 0.776)
Chronic condition: urinary incontinence/catheter (0-1)	-0.352	0.704	(0.646 - 0.766)
Diagnosis: nervous system disorder (0-1)	-0.149 ^a	0.862	(0.769 - 0.966)
Diagnosis: genitourinary system diseases (0-1)	-0.166 ^a	0.847	(0.741 - 0.967)
Length of stay: more than 31 days (0-1)	0.179	1.196	(1.098 - 1.302)
Constant	0.653		

Number of Risk Factors: 20

Submodel 4: For Improvement in Urinary Incontinence restricted to patients who are at level 1 on the Urinary Incontinence scale at SOC/ROC.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Inpatient discharge from hospital (0-1)	0.262	1.299	(1.235 - 1.366)
Inpatient discharge from rehab. facility (0-1)	0.320	1.377	(1.282 - 1.480)
Inpatient discharge from nursing home (0-1)	0.173	1.189	(1.101 - 1.283)
Urinary incontinence with past 2 weeks (0-1)	-0.475	0.622	(0.595 - 0.651)
Impaired decision-making prior to past 2 weeks (0-1)	-0.095 ^a	0.909	(0.847 - 0.976)
Good functional status rehabilitation prognosis (0-1)	0.211	1.235	(1.168 - 1.306)
Obesity at SOC (0-1)	-0.137	0.872	(0.820 - 0.927)
Age (in years)	-0.004	0.996	(0.994 - 0.998)
Gender: female (0-1)	-0.236	0.790	(0.748 - 0.834)
Patient lives in own home (0-1)	0.054 ^b	1.056	(1.003 - 1.111)
Patient lives with family member (0-1)	0.142	1.153	(1.101 - 1.207)
Vision impairment (0-2)	-0.054 ^a	0.948	(0.907 - 0.991)
Speech/language impairment (0-5)	-0.055 ^a	0.946	(0.911 - 0.983)
Surgical wound(s) present (0-1)	0.203	1.225	(1.139 - 1.317)

TABLE 25: Logistic Regression Model for Predicting the Outcome of Improvement in Urinary Incontinence. (Cont'd)

Submodel 4: For Improvement in Urinary Incontinence restricted to patients who are at level 1 on the Urinary Incontinence scale at SOC/ROC. (Cont'd)

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Dyspnea (0-4)	-0.042	0.959	(0.939 - 0.978)
Bowel incontinence frequency (0-5)	-0.126	0.882	(0.856 - 0.908)
Depression scale (0-5)	-0.041 ^b	0.960	(0.923 - 0.997)
Disability in cognitive functioning (0-4)	-0.051 ^a	0.950	(0.910 - 0.991)
Confusion scale (0-4)	-0.067	0.936	(0.908 - 0.964)
Disability in transferring (0-5)	-0.062 ^a	0.940	(0.903 - 0.978)
Disability in ambulation (0-5)	-0.108	0.897	(0.867 - 0.929)
Prior (2 weeks ago) disability in bathing (0-5)	-0.059	0.943	(0.927 - 0.959)
Prior (2 weeks ago) disability in telephone use (0-5)	-0.061	0.941	(0.922 - 0.961)
Acute condition: open wound/lesion (0-1)	-0.188	0.829	(0.782 - 0.878)
Acute condition: contagious/communicable disease (0-1)	-0.227 ^b	0.797	(0.651 - 0.975)
Chronic condition: dependence in medication admin. (0-1)	-0.155	0.856	(0.811 - 0.904)
Diagnosis: blood diseases (0-1)	-0.137	0.872	(0.802 - 0.947)
Diagnosis: nervous system disorder (0-1)	-0.157	0.855	(0.801 - 0.913)
Diagnosis: genitourinary system diseases (0-1)	-0.100 ^a	0.905	(0.844 - 0.970)
Length of stay: more than 31 days (0-1)	0.196	1.217	(1.163 - 1.273)
Constant	1.144		

Number of Risk Factors: 30

Number of Unique Risk Factors Across All Model Components: 57

Overall model developmental sample $R^2 = 0.119^{\S}$

Overall model developmental sample C-statistic = 0.696[§]

Overall model validation sample $R^2 = 0.119^{\S}$

Overall model validation sample C-statistic = 0.695[§]

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

† The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.

‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.

TABLE 25: Logistic Regression Model for Predicting the Outcome of Improvement in Urinary Incontinence. (Cont'd)

A primary diagnosis and up to five other diagnoses are recorded for each patient at SOC/ROC. Each of the up to six diagnoses is rated according to the following five-level severity index:

0 - Asymptomatic, no treatment needed at this time.

1 - Symptoms well controlled with current therapy.

2 - Symptoms controlled with difficulty, affecting daily functioning; patient needs ongoing monitoring.

3 - Symptoms poorly controlled, patients needs frequent adjustment in treatment and dose monitoring.

4 - Symptoms poorly controlled, history of rehospitalizations.

§ The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 's and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]

TABLE 26: Logistic Regression Model for Predicting the Outcome of Improvement in Bowel Incontinence.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.348	1.416	(1.290 - 1.554)
Inpatient discharge from hospital (0-1)	0.244	1.277	(1.223 - 1.333)
Inpatient discharge from rehab. facility (0-1)	0.312	1.367	(1.270 - 1.471)
Inpatient discharge from nursing home (0-1)	0.278	1.320	(1.226 - 1.422)
Impaired decision-making prior to past 2 weeks (0-1)	-0.082	0.921	(0.877 - 0.967)
Good functional status rehabilitation prognosis (0-1)	0.100	1.105	(1.059 - 1.152)
Patient lives in own home (0-1)	0.112	1.118	(1.071 - 1.167)
Patient lives with family member (0-1)	0.059 ^b	1.061	(1.009 - 1.115)
Patient has unpaid live-in help (0-1)	0.095 ^a	1.099	(1.033 - 1.169)
Speech/language impairment (0-5)	-0.053	0.948	(0.928 - 0.969)
Stage of most problematic pressure ulcer (0-4)	-0.107	0.899	(0.878 - 0.920)
Number of surgical wounds present (0-4)	0.063	1.065	(1.027 - 1.105)
Urinary incontinence severity 1 (0-4)	-0.131	0.877	(0.860 - 0.895)
Bowel incontinence frequency (0-5)	0.210	1.234	(1.212 - 1.256)
Demonstrated behavior: memory deficit (0-1)	-0.056 ^b	0.945	(0.899 - 0.994)
Demonstrated behavior: verbal disruption (0-1)	-0.160	0.853	(0.780 - 0.932)
Confusion scale (0-4)	-0.036	0.964	(0.946 - 0.983)
Disability in grooming (0-3)	-0.055	0.947	(0.921 - 0.973)
Disability in transferring (0-5)	-0.070	0.932	(0.909 - 0.955)
Disability in ambulation (0-5)	-0.115	0.891	(0.869 - 0.914)
Disability in eating (0-5)	-0.068	0.935	(0.911 - 0.959)
Disability in telephone use (0-5)	-0.026	0.975	(0.961 - 0.989)
Prior (2 weeks ago) disability in toileting (0-4)	-0.122	0.885	(0.870 - 0.901)
Prior (2 weeks ago) disability in shopping (0-3)	-0.057	0.945	(0.918 - 0.973)
Chronic condition: dependence in personal care (0-1)	-0.096	0.908	(0.855 - 0.965)
Chronic condition: urinary incontinence/catheter (0-1)	-0.156	0.856	(0.815 - 0.898)
Diagnosis: neoplasms (0-1)	-0.123 ^a	0.884	(0.817 - 0.956)
Diagnosis: blood diseases (0-1)	-0.084 ^b	0.920	(0.853 - 0.992)
Diagnosis: nervous system disorder (0-1)	-0.123	0.884	(0.844 - 0.927)
Length of stay: more than 31 days (0-1)	0.383	1.466	(1.410 - 1.525)
Constant	0.663		

Number of Risk Factors: 30

Developmental Sample $R^2 = 0.141^{\S}$

Validation Sample $R^2 = 0.154^{\S}$

Developmental Sample C-statistic = 0.719[§]

Validation Sample C-statistic = 0.729[§]

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

† The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.

TABLE 26: Logistic Regression Model for Predicting the Outcome of Improvement in Bowel Incontinence. (Cont'd)

- ‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.
- § The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]
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TABLE 27: Logistic Regression Model for Predicting the Outcome of Improvement in Confusion Frequency.

This model is comprised of four logistic regression submodels that predict the outcome of Improvement in Confusion Frequency for patients in four distinct subpopulations defined by their health status at start or resumption of care (SOC/ROC):

The first submodel predicts this outcome for patients who are at level 4 on the Confusion Frequency scale at SOC/ROC.

The second submodel predicts this outcome for patients who are at level 3 on the Confusion Frequency scale at SOC/ROC.

The third submodel predicts this outcome for patients who are at level 2 on the Confusion Frequency scale at SOC/ROC.

The fourth submodel predicts this outcome for patients who are at level 1 on the Confusion Frequency scale at SOC/ROC.

Risk factors, coefficients, odds ratios, and confidence intervals for odds ratios are presented below for each of the four submodels. Thereafter, summary statistics provide information on the total number of unique risk factors (because some risk factors appear in more than one submodel) and the explanatory power of the overall model that results from combining the submodels.

Submodel 1: For Improvement in Confusion Frequency restricted to patients who are at level 4 on the Confusion Frequency scale at SOC/ROC.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Incontinent during day and night (0-1)	-0.104 ^b	0.902	(0.822 - 0.989)
Demonstrated behavior: memory deficit (0-1)	-0.151 ^a	0.860	(0.778 - 0.950)
Demonstrated behavior: impaired decision-making (0-1)	-0.095 ^b	0.909	(0.831 - 0.994)
Demonstrated behavior: disruptive, infant, socially inappr. (0-1)	-0.237 ^a	0.789	(0.674 - 0.924)
Bowel incontinence frequency (0-5)	-0.041 ^a	0.960	(0.934 - 0.987)
Disability in cognitive functioning (0-4)	-0.259	0.772	(0.732 - 0.814)
Total number of chronic conditions reported (0-9)	-0.067	0.935	(0.901 - 0.971)
Gender: female (0-1)	-0.237	0.789	(0.723 - 0.861)
Inpatient discharge from hospital (0-1)	0.368	1.444	(1.330 - 1.569)
Inpatient discharge from rehab. facility (0-1)	0.590	1.803	(1.521 - 2.137)
Inpatient discharge from nursing home (0-1)	0.223 ^a	1.250	(1.081 - 1.446)
Patient lives with family member (0-1)	0.271	1.311	(1.191 - 1.442)
Patient lives alone (0-1)	0.274	1.315	(1.111 - 1.557)
Length of stay: more than 31 days (0-1)	0.407	1.503	(1.389 - 1.627)
Patient lives in own home (0-1)	0.133 ^a	1.142	(1.045 - 1.247)
Memory loss requiring supervision prior to past 2 weeks (0-1)	-0.126 ^a	0.881	(0.802 - 0.969)
Prior (2 weeks ago) disability in light meal preparation (0-2)	-0.193	0.825	(0.751 - 0.906)
Prior (2 weeks ago) disability in telephone use (0-5)	-0.041 ^a	0.960	(0.935 - 0.987)
Behavior problem frequency (0-5)	-0.036	0.965	(0.947 - 0.983)
Speech/language impairment (0-5)	-0.200	0.819	(0.788 - 0.850)
Diagnosis: infectious/parasitic disease (0-1)	-0.486	0.615	(0.465 - 0.814)
Diagnosis: skin/subcutaneous diseases (0-1)	-0.268	0.765	(0.677 - 0.864)
Diagnosis: mental disease (0-1)	-0.151	0.860	(0.790 - 0.936)
Diagnosis: nervous system disorder (0-1)	-0.457	0.634	(0.580 - 0.692)
Constant	1.859		

Number of Risk Factors: 24

TABLE 27: Logistic Regression Model for Predicting the Outcome of Improvement in Confusion Frequency. (Cont'd)

Submodel 2: For Improvement in Confusion Frequency restricted to patients who are at level 3 on the Confusion Frequency scale at SOC/ROC.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Acute condition: open wound/lesion (0-1)	-0.112	0.894	(0.848 - 0.942)
Acute condition: diabetes mellitus (0-1)	-0.080 ^b	0.923	(0.853 - 0.999)
Age (in years)	-0.013	0.987	(0.985 - 0.990)
Demonstrated behavior: memory deficit (0-1)	-0.172	0.842	(0.802 - 0.884)
Demonstrated behavior: verbal disruption (0-1)	-0.237	0.789	(0.706 - 0.880)
Bowel incontinence frequency (0-5)	-0.033	0.967	(0.949 - 0.986)
Chronic condition: dependence in living skills (0-1)	-0.080 ^b	0.923	(0.859 - 0.991)
Disability in cognitive functioning (0-4)	-0.258	0.773	(0.749 - 0.798)
Gender: female (0-1)	-0.115	0.891	(0.850 - 0.934)
Urinary incontinence severity 1 (0-4)	-0.042	0.959	(0.943 - 0.976)
Inpatient discharge from hospital (0-1)	0.335	1.397	(1.330 - 1.468)
Inpatient discharge from rehab. facility (0-1)	0.472	1.603	(1.479 - 1.736)
Inpatient discharge from nursing home (0-1)	0.281	1.325	(1.223 - 1.436)
Patient lives with family member (0-1)	0.167	1.182	(1.112 - 1.257)
Patient lives alone (0-1)	0.227	1.255	(1.155 - 1.364)
Length of stay: more than 31 days (0-1)	0.402	1.495	(1.430 - 1.563)
Medical regimen change in past 14 days (0-1)	0.122	1.130	(1.065 - 1.199)
Bowel ostomy (0-1)	-0.400	0.671	(0.553 - 0.813)
Patient lives in own home (0-1)	0.058 ^b	1.060	(1.008 - 1.115)
Impaired decision-making prior to past 2 weeks (0-1)	-0.153	0.859	(0.817 - 0.902)
Disruptive/socially inappropriate behavior, past 2 weeks (0-1)	-0.186	0.831	(0.742 - 0.930)
Memory loss requiring supervision prior to past 2 weeks (0-1)	-0.155	0.857	(0.813 - 0.903)
Disability in telephone use (0-5)	-0.085	0.919	(0.905 - 0.933)
Prior (2 weeks ago) disability in mgt. of oral medications (0-2)	-0.213	0.808	(0.775 - 0.843)
Behavior problem frequency (0-5)	-0.014 ^b	0.986	(0.974 - 0.998)
Moderate or better recovery prognosis (0-1)	0.178	1.194	(1.110 - 1.285)
Prior (2 weeks ago) disability in shopping (0-3)	-0.039 ^a	0.962	(0.932 - 0.993)
Good functional status rehabilitation prognosis (0-1)	0.109	1.115	(1.057 - 1.176)
Speech/language impairment (0-5)	-0.052	0.950	(0.923 - 0.977)
Number of surgical wounds present (0-4)	0.052 ^b	1.053	(1.008 - 1.100)
Diagnosis: fractures (0-1)	-0.119	0.888	(0.824 - 0.956)
Diagnosis: mental disease (0-1)	-0.224	0.799	(0.760 - 0.841)
Diagnosis: nervous system disorder (0-1)	-0.260	0.771	(0.729 - 0.815)
Constant	1.722		

Number of Risk Factors: 33

TABLE 27: Logistic Regression Model for Predicting the Outcome of Improvement in Confusion Frequency. (Cont'd)

Submodel 3: For Improvement in Confusion Frequency restricted to patients who are at level 2 on the Confusion Frequency scale at SOC/ROC.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Inpatient discharge from hospital (0-1)	0.332	1.393	(1.250 - 1.552)
Inpatient discharge from rehab. facility (0-1)	0.496	1.643	(1.369 - 1.971)
Inpatient discharge from nursing home (0-1)	0.299	1.349	(1.122 - 1.622)
Memory loss requiring supervision prior to past 2 weeks (0-1)	-0.199	0.820	(0.725 - 0.927)
Good functional status rehabilitation prognosis (0-1)	0.293	1.341	(1.203 - 1.495)
Age (in years)	-0.009	0.991	(0.986 - 0.996)
Presence of urinary incontinence (0-1)	-0.169	0.845	(0.762 - 0.936)
Demonstrated behavior: impaired decision-making (0-1)	-0.211	0.810	(0.717 - 0.915)
Demonstrated behavior: verbal disruption (0-1)	-0.375 ^a	0.688	(0.517 - 0.915)
Disability in cognitive functioning (0-4)	-0.162	0.851	(0.794 - 0.911)
Disability in eating (0-5)	-0.122	0.885	(0.821 - 0.953)
Disability in shopping (0-3)	-0.104 ^b	0.901	(0.821 - 0.989)
Disability in telephone use (0-5)	-0.066	0.936	(0.903 - 0.970)
Prior (2 weeks ago) disability in housekeeping (0-4)	-0.060 ^a	0.942	(0.901 - 0.984)
Prior (2 weeks ago) disability in mgt. of oral medications (0-2)	-0.204	0.816	(0.749 - 0.888)
Diagnosis: blood diseases (0-1)	-0.192 ^b	0.826	(0.686 - 0.993)
Diagnosis: mental disease (0-1)	-0.298	0.742	(0.649 - 0.849)
Diagnosis: nervous system disorder (0-1)	-0.226	0.798	(0.698 - 0.911)
Length of stay: more than 31 days (0-1)	0.454	1.574	(1.422 - 1.741)
Constant	1.919		

Number of Risk Factors: 19

Submodel 4: For Improvement in Confusion Frequency restricted to patients who are at level 1 on the Confusion Frequency scale at SOC/ROC.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Medicare as a payment source (0-1)	0.220	1.245	(1.170 - 1.326)
Inpatient discharge from hospital (0-1)	0.281	1.325	(1.289 - 1.361)
Inpatient discharge from rehab. facility (0-1)	0.469	1.599	(1.537 - 1.663)
Inpatient discharge from nursing home (0-1)	0.211	1.234	(1.181 - 1.290)
Impaired decision-making prior to past 2 weeks (0-1)	-0.217	0.805	(0.775 - 0.836)
Memory loss requiring supervision prior to past 2 weeks (0-1)	-0.146	0.864	(0.825 - 0.906)
Moderate or better recovery prognosis (0-1)	0.100	1.106	(1.046 - 1.169)
Good functional status rehabilitation prognosis (0-1)	0.098	1.103	(1.067 - 1.140)
Heavy smoking at SOC (0-1)	-0.063 ^a	0.939	(0.898 - 0.983)
Age (in years)	-0.011	0.989	(0.988 - 0.991)
Gender: female (0-1)	-0.039 ^a	0.961	(0.937 - 0.987)
Patient lives in own home (0-1)	0.056	1.057	(1.026 - 1.090)
Patient lives with family member (0-1)	0.200	1.222	(1.171 - 1.275)
Patient lives alone (0-1)	0.122	1.130	(1.076 - 1.185)
Vision impairment (0-2)	-0.056	0.945	(0.924 - 0.967)
Hearing impairment (0-4)	-0.036	0.964	(0.947 - 0.982)
Speech/language impairment (0-5)	-0.135	0.873	(0.856 - 0.891)

TABLE 27: Logistic Regression Model for Predicting the Outcome of Improvement in Confusion Frequency. (Cont'd)

Submodel 4: For Improvement in Confusion Frequency restricted to patients who are at level 1 on the Confusion Frequency item at SOC/ROC. (Cont'd)

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Surgical wound(s) present (0-1)	0.184	1.202	(1.139 - 1.269)
Number of surgical wounds present (0-4)	0.030 ^a	1.031	(1.007 - 1.055)
Dyspnea (0-4)	-0.024	0.976	(0.966 - 0.987)
Urinary catheter (0-1)	-0.157	0.855	(0.802 - 0.911)
Presence of urinary incontinence (0-1)	-0.193	0.824	(0.803 - 0.846)
Anxiety level (0-3)	-0.039	0.961	(0.947 - 0.976)
Demonstrated behavior: memory deficit (0-1)	-0.173	0.842	(0.806 - 0.879)
Demonstrated behavior: verbal disruption (0-1)	-0.255	0.775	(0.677 - 0.888)
Demonstrated behavior: disruptive, infant, socially inappr. (0-1)	-0.321 ^a	0.726	(0.581 - 0.907)
Disability in cognitive functioning (0-4)	-0.309	0.734	(0.719 - 0.750)
Disability in mgt. of oral medications (0-2)	-0.101	0.904	(0.883 - 0.925)
Disability in telephone use (0-5)	-0.057	0.945	(0.935 - 0.955)
Prior (2 weeks ago) disability in transportation (0-2)	-0.092	0.912	(0.885 - 0.939)
Acute condition: open wound/lesion (0-1)	-0.057	0.945	(0.914 - 0.977)
Acute condition: terminal (0-1)	-0.119 ^a	0.888	(0.820 - 0.961)
Chronic condition: dependence in medication admin. (0-1)	-0.169	0.844	(0.818 - 0.871)
Diagnosis: endocrine/nutritional/metabolic (0-1)	-0.080	0.923	(0.900 - 0.947)
Diagnosis: mental disease (0-1)	-0.280	0.756	(0.727 - 0.786)
Diagnosis: other injury (0-1)	-0.114	0.892	(0.848 - 0.939)
Length of stay: more than 31 days (0-1)	0.136	1.145	(1.118 - 1.173)
Constant	0.464		

Number of Risk Factors: 37

Number of Unique Risk Factors Across All Model Components: 60

Overall model developmental sample $R^2 = 0.111^{\S}$

Overall model developmental sample C-statistic = 0.693[§]

Overall model validation sample $R^2 = 0.110^{\S}$

Overall model validation sample C-statistic = 0.692[§]

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

† The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.

TABLE 27: Logistic Regression Model for Predicting the Outcome of Improvement in Confusion Frequency. (Cont'd)

- ‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.
- § The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]
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TABLE 28: Logistic Regression Model for Predicting the Outcome of Discharged to Community.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Inpatient discharge from hospital (0-1)	-0.217	0.805	(0.791 - 0.820)
Medical regimen change in past 14 days (0-1)	0.136	1.146	(1.120 - 1.172)
Urinary catheter prior to past 2 weeks (0-1)	-0.449	0.639	(0.603 - 0.676)
Maximum severity rating among all diagnoses (0-4)#	-0.138	0.871	(0.860 - 0.882)
Number of diagnoses with severity rating > 2 (0-6)#	-0.062	0.940	(0.933 - 0.946)
Moderate or better recovery prognosis (0-1)	0.296	1.344	(1.303 - 1.387)
Good functional status rehabilitation prognosis (0-1)	0.345	1.412	(1.382 - 1.443)
Gender: female (0-1)	0.075	1.078	(1.059 - 1.096)
Patient lives in own home (0-1)	0.059	1.061	(1.039 - 1.082)
Patient lives with family member (0-1)	-0.150	0.861	(0.836 - 0.887)
Patient lives alone (0-1)	-0.274	0.760	(0.735 - 0.786)
Vision impairment (0-2)	-0.031	0.970	(0.955 - 0.985)
Pain interfering with activity (0-3)	-0.046	0.955	(0.947 - 0.963)
Intractable pain (0-1)	-0.118	0.889	(0.866 - 0.912)
Stage of most problematic pressure ulcer (0-4)	-0.062 ^a	0.940	(0.899 - 0.983)
Status of most problematic pressure ulcer (0-3)	-0.069	0.933	(0.898 - 0.969)
Stage 3-4 pressure ulcer(s) present (0-1)	-0.490	0.612	(0.562 - 0.667)
Status of most problematic stasis ulcer (0-3)	-0.230	0.794	(0.767 - 0.822)
Number of stasis ulcers present (0-4)	-0.059	0.943	(0.909 - 0.978)
Surgical wound(s) present (0-1)	0.589	1.802	(1.717 - 1.892)
Status of surgical wound (0-3)	-0.184	0.832	(0.811 - 0.853)
Dyspnea (0-4)	-0.170	0.843	(0.837 - 0.850)
Urinary catheter (0-1)	-0.476	0.622	(0.596 - 0.649)
Bowel ostomy (0-1)	-0.320	0.726	(0.689 - 0.765)
Bowel incontinence frequency (0-5)	-0.014 ^a	0.987	(0.978 - 0.995)
Anxiety level (0-3)	-0.069	0.933	(0.923 - 0.943)
Depression scale (0-5)	-0.108	0.898	(0.885 - 0.911)
Disability in grooming (0-3)	-0.054	0.947	(0.935 - 0.960)
Disability in dressing upper body (0-3)	-0.059	0.943	(0.930 - 0.957)
Disability in bathing (0-5)	-0.035	0.965	(0.958 - 0.973)
Disability in ambulation (0-5)	-0.062	0.940	(0.931 - 0.950)
Disability in mgt. of oral medications (0-2)	-0.062	0.940	(0.925 - 0.955)
Disability in housekeeping (0-4)	-0.028	0.972	(0.964 - 0.980)
ADL assistance provided by caregiver (0-1)	0.099	1.104	(1.081 - 1.127)
IADL assistance provided by caregiver (0-1)	0.056	1.058	(1.034 - 1.083)
Prior (2 weeks ago) disability in transportation (0-2)	-0.179	0.836	(0.817 - 0.855)
Prior (2 weeks ago) disability in laundry (0-2)	-0.081	0.923	(0.908 - 0.938)
Prior (2 weeks ago) disability in shopping (0-3)	-0.032	0.969	(0.957 - 0.981)
Acute condition: terminal (0-1)	-0.246	0.782	(0.747 - 0.818)
Acute condition: cardiac/peripheral vascular (0-1)	-0.170	0.844	(0.826 - 0.862)
Acute condition: pulmonary (0-1)	-0.081	0.922	(0.902 - 0.943)
Acute condition: diabetes mellitus (0-1)	-0.044 ^a	0.957	(0.930 - 0.985)
Acute condition: mental/emotional (0-1)	-0.519	0.595	(0.560 - 0.633)
Acute condition: oxygen therapy (0-1)	-0.269	0.764	(0.746 - 0.783)
Acute condition: IV/Infusion therapy (0-1)	-0.524	0.592	(0.566 - 0.620)
Acute condition: enteral/parenteral nutrition (0-1)	-0.467	0.627	(0.595 - 0.661)
Chronic condition: dependence in medication admin. (0-1)	-0.119	0.888	(0.868 - 0.909)
Diagnosis: infectious/parasitic disease (0-1)	-0.256	0.774	(0.742 - 0.809)
Diagnosis: neoplasms (0-1)	-0.551	0.576	(0.562 - 0.591)
Diagnosis: endocrine/nutritional/metabolic (0-1)	-0.291	0.748	(0.733 - 0.763)
Diagnosis: blood diseases (0-1)	-0.307	0.735	(0.715 - 0.756)
Diagnosis: circulatory system diseases (0-1)	-0.136	0.873	(0.855 - 0.891)

TABLE 28: Logistic Regression Model for Predicting the Outcome of Discharged to Community. (Cont'd)

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Diagnosis: digestive system diseases (0-1)	-0.212	0.809	(0.790 - 0.828)
Diagnosis: genitourinary system diseases (0-1)	-0.200	0.818	(0.800 - 0.838)
Diagnosis: skin/subcutaneous diseases (0-1)	-0.262	0.770	(0.745 - 0.795)
Diagnosis: ill-defined conditions (0-1)	-0.041	0.960	(0.943 - 0.978)
Diagnosis: other injury (0-1)	-0.256	0.774	(0.750 - 0.799)
Length of stay: more than 31 days (0-1)	0.848	2.335	(2.295 - 2.376)
Constant	2.276		

Number of Risk Factors: 58

Developmental Sample $R^2 = 0.185^{\S}$

Validation Sample $R^2 = 0.183^{\S}$

Developmental Sample C-statistic = 0.753^{\S}

Validation Sample C-statistic = 0.752^{\S}

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

† The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.

‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.

A primary diagnosis and up to five other diagnoses are recorded for each patient at SOC/ROC. Each of the up to six diagnoses is rated according to the following five-level severity index:

0 - Asymptomatic, no treatment needed at this time.

1 - Symptoms well controlled with current therapy.

2 - Symptoms controlled with difficulty, affecting daily functioning; patient needs ongoing monitoring.

3 - Symptoms poorly controlled, patients needs frequent adjustment in treatment and dose monitoring.

4 - Symptoms poorly controlled, history of rehospitalizations.

§ The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 's and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the predicted probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]

TABLE 29: Logistic Regression Model for Predicting the Outcome of Any Emergent Care Provided.

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Inpatient discharge from hospital (0-1)	0.109	1.115	(1.084 - 1.147)
Medical regimen change in past 14 days (0-1)	-0.105	0.901	(0.870 - 0.933)
Urinary catheter prior to past 2 weeks (0-1)	0.161	1.174	(1.085 - 1.271)
Maximum severity rating among all diagnoses (0-4)#	0.080	1.084	(1.063 - 1.104)
Number of diagnoses with severity rating > 2 (0-6)#	0.036	1.036	(1.027 - 1.046)
Moderate or better recovery prognosis (0-1)	-0.124	0.883	(0.845 - 0.923)
Good functional status rehabilitation prognosis (0-1)	-0.212	0.809	(0.783 - 0.835)
Heavy smoking at SOC (0-1)	0.112	1.118	(1.072 - 1.166)
Gender: female (0-1)	-0.047	0.954	(0.930 - 0.979)
Patient lives with family member (0-1)	0.110	1.116	(1.068 - 1.166)
Patient lives alone (0-1)	0.189	1.208	(1.151 - 1.269)
Pain interfering with activity (0-3)	0.016 ^b	1.016	(1.002 - 1.029)
Intractable pain (0-1)	0.120	1.127	(1.085 - 1.171)
Stage of most problematic pressure ulcer (0-4)	0.123	1.131	(1.108 - 1.154)
Number of stasis ulcers present (0-4)	0.166	1.180	(1.145 - 1.216)
Surgical wound(s) present (0-1)	-0.429	0.651	(0.602 - 0.704)
Status of surgical wound (0-3)	0.111	1.117	(1.075 - 1.161)
Dyspnea (0-4)	0.124	1.132	(1.119 - 1.145)
Urinary catheter (0-1)	0.298	1.347	(1.266 - 1.433)
Bowel incontinence frequency (0-5)	0.013 ^b	1.013	(1.000 - 1.026)
Anxiety level (0-3)	0.061	1.063	(1.047 - 1.079)
Depression scale (0-5)	0.070	1.072	(1.049 - 1.096)
Disability in grooming (0-3)	0.024 ^a	1.025	(1.004 - 1.045)
Disability in dressing upper body (0-3)	0.043	1.044	(1.022 - 1.067)
Disability in bathing (0-5)	0.026	1.027	(1.015 - 1.038)
Disability in mgt. of oral medications (0-2)	0.053	1.055	(1.030 - 1.080)
Disability in housekeeping (0-4)	0.032	1.032	(1.020 - 1.045)
Prior (2 weeks ago) disability in transportation (0-2)	0.156	1.169	(1.136 - 1.203)
Acute condition: open wound/lesion (0-1)	0.040 ^b	1.040	(1.003 - 1.079)
Acute condition: cardiac/peripheral vascular (0-1)	0.168	1.182	(1.146 - 1.220)
Acute condition: gastrointestinal disorder (0-1)	0.099	1.104	(1.053 - 1.157)
Acute condition: mental/emotional (0-1)	0.420	1.522	(1.390 - 1.667)
Acute condition: oxygen therapy (0-1)	0.162	1.175	(1.133 - 1.219)
Acute condition: IV/Infusion therapy (0-1)	0.345	1.412	(1.320 - 1.510)
Acute condition: enteral/parenteral nutrition (0-1)	0.332	1.394	(1.296 - 1.500)
Chronic condition: dependence in medication admin. (0-1)	0.088	1.092	(1.055 - 1.130)
Diagnosis: infectious/parasitic disease (0-1)	0.186	1.204	(1.130 - 1.283)
Diagnosis: neoplasms (0-1)	0.250	1.284	(1.236 - 1.334)
Diagnosis: endocrine/nutritional/metabolic (0-1)	0.223	1.249	(1.217 - 1.282)
Diagnosis: blood diseases (0-1)	0.171	1.187	(1.139 - 1.236)
Diagnosis: circulatory system diseases (0-1)	0.110	1.117	(1.082 - 1.152)
Diagnosis: respiratory system diseases (0-1)	0.127	1.136	(1.100 - 1.172)
Diagnosis: digestive system diseases (0-1)	0.093	1.098	(1.049 - 1.148)
Diagnosis: genitourinary system diseases (0-1)	0.123	1.131	(1.093 - 1.171)
Diagnosis: other injury (0-1)	0.160	1.173	(1.117 - 1.232)
Length of stay: more than 31 days (0-1)	-0.570	0.565	(0.551 - 0.580)
Intervening inpatient care (0-1)	0.692	1.997	(1.933 - 2.063)
Constant	-2.400		

TABLE 29: Logistic Regression Model for Predicting the Outcome of Any Emergent Care Provided. (Cont'd)

Number of Risk Factors: 47

Developmental Sample $R^2 = 0.100^{\S}$ Validation Sample $R^2 = 0.099^{\S}$

Developmental Sample C-statistic = 0.710^{\S} Validation Sample C-statistic = 0.707^{\S}

* SOC = Start of Care, ROC = Resumption of Care after inpatient stay. Risk factors pertain to SOC/ROC unless indicated otherwise.

† The number of values in the measurement scale for each risk factor is in parentheses. For risk factors that take on the values 0 and 1, 1 denotes the presence of the attribute and 0 denotes its absence. For risk factors reflecting health or functional status that are defined using a scale that takes on more than two values, higher values of the scale indicate greater impairment or severity of illness. Selected risk factors take on values that represent simple counts (typically the number of health problems) -- as indicated by the risk factor label. The meaning associated with specific values for each risk factor can be determined by reference to the OASIS data set.

‡ All coefficients/odds ratios are significant at $P < .10$, using the likelihood ratio test for the hypothesis that the coefficient is zero (i.e., the odds ratio is 1.00). Coefficients/odds ratios significant for $.05 < P < .10$ are superscripted by "b." Those that are significant for $.01 < P < .05$ are superscripted by "a," and the remainder are significant for $P < .01$. 90% CIs (confidence intervals) are given and odds ratios are considered significant at $P < .10$, because risk models were developed not to assess or evaluate impacts of risk factors on outcomes; rather, they are used primarily for predictive or risk adjustment purposes. Using the 10% significance level meets the need to be more inclusive for prediction/risk adjustment purposes, typically resulting in more stable models whose performance is superior under cross validation.

A primary diagnosis and up to five other diagnoses are recorded for each patient at SOC/ROC. Each of the up to six diagnoses is rated according to the following five-level severity index:

0 - Asymptomatic, no treatment needed at this time.

1 - Symptoms well controlled with current therapy.

2 - Symptoms controlled with difficulty, affecting daily functioning; patient needs ongoing monitoring.

3 - Symptoms poorly controlled, patient needs frequent adjustment in treatment and dose monitoring.

4 - Symptoms poorly controlled, history of rehospitalizations.

§ The R^2 values are the squared correlations between predicted and observed values for all patients in the developmental (validation) sample. The developmental sample size for most outcomes is approximately 500,000, with some variation in this number depending on statistical attributes of the outcome measure and risk model. The validation sample is approximately 1,000,000 for all models. These sample sizes pertain to both R^2 s and C-statistics. C is defined as the area under the Receiver Operating Characteristic curve. Intuitively, the C-statistic has the following interpretation: Let $Y=1$ denote outcome attainment, $Y=0$ denote non-attainment, and \hat{p} denote the **predicted** probability that $Y=1$. Construct all possible pairs of sample patients where $Y=1$ for one member of the pair and $Y=0$ for the other. C is the proportion of such pairs where \hat{p} for the patient with $Y=1$ is larger than \hat{p} for the patient with $Y=0$. [Note that \hat{p} is obtained by substituting a patient's values for all risk factors into the risk model for the outcome under consideration.]

TABLE 30: Logistic Regression Model for Predicting the Outcome of Acute Care Hospitalization.

Risk Factor Measured at SOC/ROC[†]	Coefficient[‡]	Odds Ratio[‡]	(90% CI)[‡]
Inpatient discharge from hospital (0-1)	0.248	1.282	(1.249 - 1.315)
Urinary catheter prior to past 2 weeks (0-1)	0.431	1.539	(1.424 - 1.663)
Maximum severity rating among all diagnoses (0-4) [#]	0.142	1.152	(1.132 - 1.173)
Number of diagnoses with severity rating > 2 (0-6) [#]	0.056	1.058	(1.048 - 1.067)
Moderate or better recovery prognosis (0-1)	-0.127	0.880	(0.844 - 0.919)
Good functional status rehabilitation prognosis (0-1)	-0.303	0.739	(0.717 - 0.762)
Gender: female (0-1)	-0.066	0.937	(0.914 - 0.960)
Patient lives with family member (0-1)	0.158	1.171	(1.124 - 1.220)
Patient lives alone (0-1)	0.237	1.267	(1.210 - 1.327)
Vision impairment (0-2)	0.030 ^a	1.031	(1.008 - 1.054)
Pain interfering with activity (0-3)	0.036	1.036	(1.023 - 1.049)
Intractable pain (0-1)	0.127	1.136	(1.095 - 1.178)
Stage of most problematic pressure ulcer (0-4)	0.101	1.106	(1.074 - 1.139)
Stage 3-4 pressure ulcer(s) present (0-1)	0.424	1.528	(1.372 - 1.701)
Status of most problematic stasis ulcer (0-3)	0.240	1.271	(1.236 - 1.307)
Surgical wound(s) present (0-1)	-0.549	0.577	(0.538 - 0.619)
Status of surgical wound (0-3)	0.181	1.198	(1.155 - 1.242)
Dyspnea (0-4)	0.166	1.181	(1.168 - 1.194)
Urinary catheter (0-1)	0.382	1.465	(1.380 - 1.556)
Bowel ostomy (0-1)	0.362	1.436	(1.333 - 1.547)
Bowel incontinence frequency (0-5)	0.012 ^b	1.012	(1.000 - 1.025)
Anxiety level (0-3)	0.062	1.064	(1.048 - 1.079)
Depression scale (0-5)	0.095	1.099	(1.077 - 1.122)
Disability in grooming (0-3)	0.024 ^a	1.025	(1.005 - 1.044)
Disability in dressing upper body (0-3)	0.063	1.065	(1.044 - 1.087)
Disability in bathing (0-5)	0.034	1.034	(1.023 - 1.046)
Disability in ambulation (0-5)	0.038	1.038	(1.023 - 1.053)
Disability in housekeeping (0-4)	0.026	1.026	(1.014 - 1.038)
ADL assistance provided by caregiver (0-1)	-0.091	0.913	(0.886 - 0.941)
IADL assistance provided by caregiver (0-1)	-0.077	0.926	(0.896 - 0.957)
Prior (2 weeks ago) disability in transportation (0-2)	0.187	1.206	(1.168 - 1.245)
Prior (2 weeks ago) disability in laundry (0-2)	0.080	1.084	(1.058 - 1.109)
Prior (2 weeks ago) disability in shopping (0-3)	0.034	1.035	(1.017 - 1.053)
Acute condition: cardiac/peripheral vascular (0-1)	0.177	1.194	(1.159 - 1.230)
Acute condition: pulmonary (0-1)	0.078	1.081	(1.047 - 1.116)
Acute condition: mental/emotional (0-1)	0.608	1.837	(1.686 - 2.001)
Acute condition: oxygen therapy (0-1)	0.278	1.320	(1.275 - 1.366)
Acute condition: IV/Infusion therapy (0-1)	0.534	1.706	(1.599 - 1.819)
Acute condition: enteral/parenteral nutrition (0-1)	0.466	1.594	(1.484 - 1.713)
Chronic condition: dependence in medication admin. (0-1)	0.176	1.193	(1.159 - 1.227)
Diagnosis: infectious/parasitic disease (0-1)	0.256	1.292	(1.215 - 1.373)
Diagnosis: neoplasms (0-1)	0.404	1.498	(1.445 - 1.553)
Diagnosis: endocrine/nutritional/metabolic (0-1)	0.307	1.359	(1.326 - 1.393)
Diagnosis: blood diseases (0-1)	0.306	1.358	(1.306 - 1.412)
Diagnosis: circulatory system diseases (0-1)	0.142	1.152	(1.118 - 1.187)
Diagnosis: digestive system diseases (0-1)	0.195	1.215	(1.175 - 1.257)
Diagnosis: genitourinary system diseases (0-1)	0.192	1.212	(1.172 - 1.252)
Diagnosis: skin/subcutaneous diseases (0-1)	0.273	1.313	(1.254 - 1.375)
Diagnosis: ill-defined conditions (0-1)	0.035 ^a	1.036	(1.010 - 1.063)
Diagnosis: other injury (0-1)	0.255	1.290	(1.233 - 1.350)

TABLE 30: Logistic Regression Model for Predicting the Outcome of Acute Care Hospitalization. (Cont'd)

Risk Factor Measured at SOC/ROC*†	Coefficient‡	Odds Ratio‡	(90% CI)‡
Length of stay: more than 31 days (0-1)	-0.769	0.463	(0.452 - 0.475)
Constant	-2.701		

Number of Risk Factors: 51

Developmental Sample $R^2 = 0.152^{\S}$ Validation Sample $R^2 = 0.150^{\S}$

Developmental Sample C-statistic = 0.740[§] Validation Sample C-statistic = 0.738[§]

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